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ENVIRONMENTAL NOISE ASSESSMENT, WACO, TEXAS METROPOLITAN AREA

George J. Putnicki, et al

Environmental Protection Agency
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This report presents development and successful demonstration of an environmental noise monitoring methodology. Readings from sound level meter were made every ten seconds and recorded on data sheets. Cassette tape recorder was turned on at five-minute intervals. Weather data was collected during each hour of monitoring. Data was compared to data obtained using more sophisticated equipment. Results of comparisons proved that methodology used was sufficient for purpose of community noise surveys to assist local planners. Noise measurements were made at seventeen sites. Consideration was given on site selection to noise sensitivity of land use proximity to known or potential noise sources and discreteness of land use areas. Conclusion was that Waco, Texas, metropolitan area is marginally quiet and recommended steps be taken by city planners to assure continuation of quiet.

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ENVIRONMENTAL NOISE ASSESSMENT
WACO, TEXAS METROPOLITAN AREA

by

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ia

ABSTRACT

This report presents the development and successful demonstration of a unique environmental noise monitoring methodology in assessing environmental noise levels in the Waco, Texas metropolitan area. The methodology demonstrated utilizes the least sophisticated of sound measuring equipment, namely, the hand-held sound level meter, cassette recorder, stopwatch, an inexpensive tripod, and an inexpensive weather station.

Readings from the sound level meter were made every 10 seconds by students and other personnel inexperienced in noise measurements, who had received only a minimal amount of training, and recorded on data sheets specifically designed for this project. The cassette tape recorder was turned on at five-minute intervals for approximately twenty seconds. Weather data was also collected during each hour of monitoring, and the calibration of the sound level meter was checked before and after each hour of monitoring. Data obtained was compared to data obtained using the more sophisticated tape recorder and noise classifiers. The results of the comparisons proved

that the methodology used is sufficient for the purpose of community noise surveys to assist local planners, and that untrained personnel using the least expensive of equipment can successfully make the necessary sound level measurements.

Environmental noise measurements were made at seventeen sites. In selecting sites, consideration was given to noise sensitivity of land use, proximity to known or potential environmental noise sources and discreetness of land use area.

From the data obtained in this assessment, it can be concluded that the environmental noise levels in the Waco, Texas, metropolitan area are in a range that are not, for the most part, considered annoying or intrusive. Waco, Texas, is a marginally quiet city and it is recommended that steps be taken by the city government to assure that it will remain quiet. These steps include the adoption of a noise ordinance and the establishment of a noise unit of city government.

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I CONCLUSIONS

The results of an extensive environmental noise assessment conducted in the Waco area November 29, 1973 through December 3, 1973 and January 8-11, 1974 are contained in this report.

The following conclusions can be made as a result of this activity:

1. The principal noise sources in the Waco Metropolitan Area are rail and motor carriers, automobile and motorcycle traffic, and barking of dogs.

2. Secondary noise sources include aircraft, namely, the military helicopters and private propeller-driven aircraft, home power tools, factories, and both light and heavy construction.

3. A comparison of the noise level statistics derived from noise measurements in the Waco Metropolitan Area with levels identified by the EPA and other Federal agencies leads to the conclusion that it is a marginally quiet area on the whole and should be protected from future major noise sources.

4. An environmental noise assessment of a metropolitan area can be conducted utilizing the least expensive of the available noise measuring equipment,

manned by inexperienced personnel after receiving only a minimal amount of training.

5. Twenty-one Baylor University students have been oriented and trained to make noise measurements using a type 2 hand-held noise level meter and could compose a cadre of local personnel for conducting future noise assessments in the Waco area.

6. Personnel from other Region VI Environmental Protection Agency Programs, namely, Management Division, the Pesticides Branch and the Oil and Hazardous Substances Branch of the Hazardous Materials Control Division have been properly oriented and trained for use in future environmental noise assessments in noise critical areas in Region VI.

7. The Region VI, Environmental Protection Agency Noise Program has obtained additional noise measuring equipment, has developed a computerized data reduction system, and is better prepared to conduct environmental noise assessments and surveys.

8. The Waco, Texas noise awareness program has been further implemented and considerably more interest has been generated as a result of six lectures and demonstrations that were conducted to various high school science classes and other interested parties, and also as a result of extensive local participation in the project.

9. Environmental noise data were obtained at seventeen sites in the Waco metropolitan area over a four-day period including two week days and two weekend days. Site-ensemble averages show an average maximum level of 81 dBA, an average minimum of 37 dBA and an average L_{eq} of 56 ± 1.8 dBA. Lowest noise levels were measured in rural and suburban areas with low traffic density. Highest noise levels were measured at sites located near highways and interchanges.

10. A spatial study conducted at the Timbercrest site indicated that there was no statistically significant difference between A-weighted noise measurements made at the central station and the surrounding substations established in the Timbercrest neighborhood. From the spatial study it can be concluded that the noise measurements made at the Timbercrest station are representative of the entire neighborhood not merely that immediate location of the station.

II RECOMMENDATIONS

As a result of the environmental noise assessment conducted in the Waco, Texas Metropolitan Area the following recommendations are respectfully submitted.

1. The City of Waco, Texas either establish a noise unit of city government or delegate all noise responsibilities to an existing city unit.

2. An evaluation be made of the existing city nuisance ordinance; determine its utility in light of the new Federal legislation and consider adopting a new comprehensive noise control program including an effective noise ordinance and proper land use planning.

3. Noise measuring equipment be purchased by the City of Waco.

4. The City of Waco assume the lead role in initiating a follow-up phase of this project, by repeating the assessment in April or early May, 1974 to determine the impact of moving commercial airline training flights to James Connally Airport.

5. The City of Waco utilize the trained cadre of Baylor Physics Department students and consider

training and utilizing high school students to assist in making noise measurements at the same sites used in this survey.

III INTRODUCTION

The Environmental Protection Agency's noise control activities are authorized by the "Noise Pollution and Abatement Act of 1970"(Title IV of the Clean Air Act), and the "Noise Control Act of 1972". The broad mission of the new EPA Office of Noise Abatement and Control, established in April 1971, is to identify and classify causes and sources of noise and determine their effects on public health and welfare. The enabling legislation requires that a special report to Congress be prepared which will include information on present Federal programs, State and local laws, regulations, and enforcement capabilities. This report will also contain the state-of-the-art on control technology and recommendations on a long-range National noise abatement and control program. The law also requires that, for the first time, all Federal agencies include noise as a consideration in preparing statements describing the environmental impacts of their various projects.

The law further directs the Environmental Protection Agency to develop criteria with respect to noise, to publish information on the levels of environmental noise required to protect public health and welfare, and to identify major sources of noise. The

Environmental Protection Agency is also directed to propose noise emission standards for identified major sources of noise.

In support of the national mission, the Region VI Environmental Protection Agency noise program developed and implemented a program to conduct an environmental noise assessment in the Waco, Texas metropolitan area.

The Waco, Texas metropolitan area was selected for this project for a number of reasons; namely, interest expressed by the City officials to obtain environmental noise data for use in land planning and zoning; the availability of students in the Baylor University Physics Department to assist in manning the monitoring stations, and the availability and interest of competent faculty members to provide the leadership necessary to complete this type of activity; the availability of well organized environmental high school organizations to assist in the monitoring; the size of the metropolitan area and the availability of discrete noise sensitive land use areas; and lastly, the project provided an opportunity to obtain base-line noise data at stations located in close proximity to the Texas State Technical Insitute located at the site of the deactivated James Connally Airport where commercial aircraft training flights began shortly after the official opening of the new Dallas-Fort Worth Airport.

IV DESCRIPTION OF THE WACO, TEXAS METROPOLITAN AREA

The City of Waco, Texas, is located near the geographical center of Texas and almost at the center of Texas' population density (Figure 1). Waco is approximately 100 miles south of Dallas, Texas. The area of the City is 76.61 square miles and is encompassed by level plains suitable for farm and pasture land. Waco is approximately 427 feet above mean sea level. The mean annual temperature is 67.2 degrees F, and Waco has an average annual rainfall of 32.08 inches. Average relative humidity (yearly average) is 80% at 6:00a.m. and 54% at 6:00p.m.

The present population of the City of Waco is over 102,000 persons and the Waco metropolitan area population is over 150,000 persons. A map of the Waco, Texas, metropolitan area is shown on Figure 2.

Waco is served by Texas International Airlines, which provides seven flights per day to Waco Municipal Airport. Four common carrier motor bus lines having 47 daily scheduled trips serve the City. It is also served by MKT, Missouri Pacific, Southern Pacific, and St. Louis Southwestern Railroads offering 22 freight schedules daily.

Waco has more than 170 manufacturing concerns employing over 13,000 persons. The gross farm income in McLennan County in 1972, was $33,198,167. Principal crops produced include cotton, grain sorghums, corn and small grains. Beef cattle, poultry and dairy products are also produced in significant quantities.

Educational facilities include Baylor University (7,900 students), Paul Quinn College (429 students), the James Connally Campus of Texas State Technical Institute (3,100 students), McLennan Community College, four high schools, seven junior high schools, twenty-six elementary schools with a total enrollment of 17,251 students in Waco Public Schools. Waco also has eleven parochial schools, including one high school and four proprietary schools.

Waco has 39 parks and playgrounds, covering a total of 1,483 acres. In addition, five major parks with approximately 3,700 acres are located along the shoreline of Lake Waco.

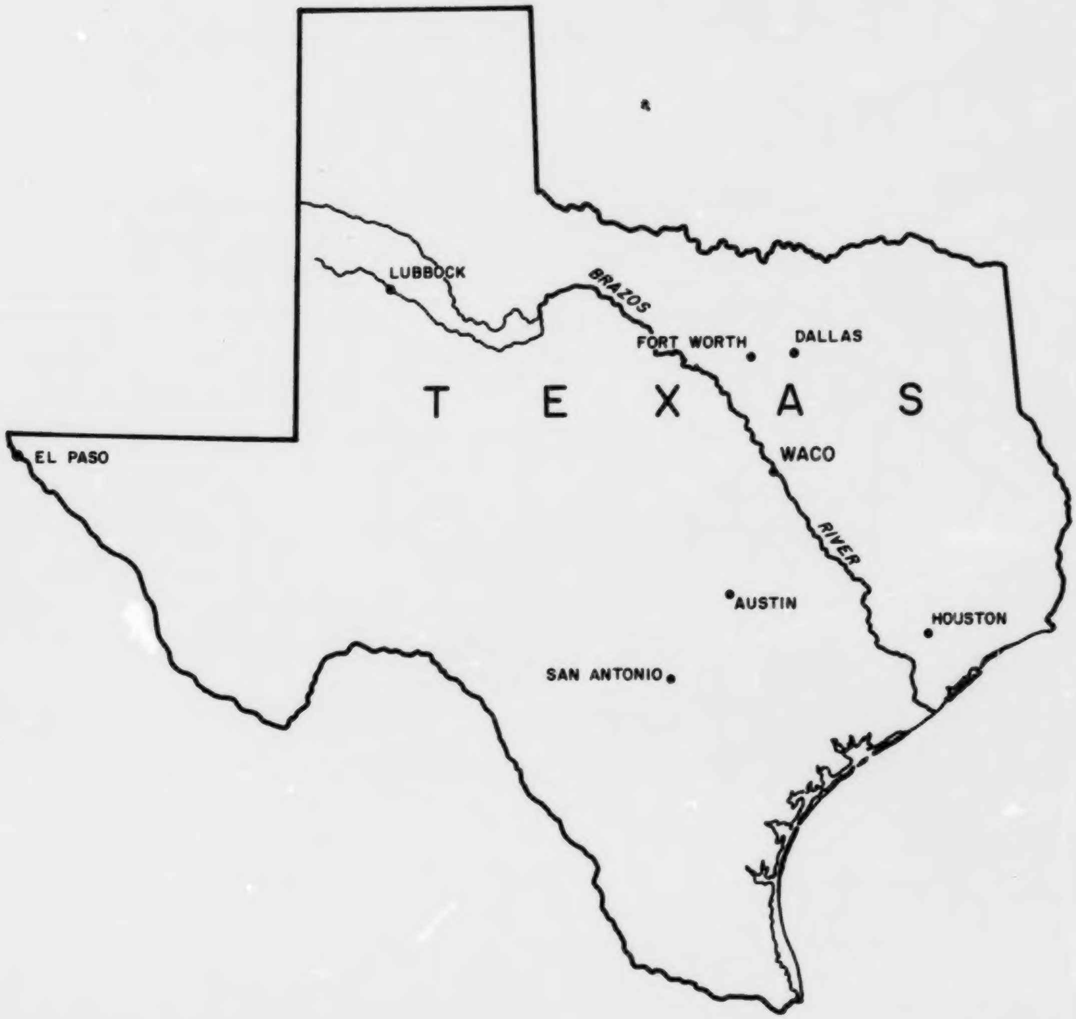


Figure I. Location of Waco, Texas

V PROJECT OBJECTIVES

The objectives of this project were:

1. To measure environmental noise levels in noise sensitive land use areas in a metropolitan area of approximately 150,000 persons for the purpose of:

    a. Obtaining an environmental noise assessment of the area for use in land planning, zoning and future development of the metropolitan area;

    b. Determining the impact of commercial and private aircraft servicing the area and the impact of surface transportation and construction noise sources;

    c. Obtaining baseline environmental noise data in the vicinity of the Texas State Technical Institute located at the site of the deactivated James Connally Airport for use in determining the impact of moving major training activities from the Greater Southwest Airport in Fort Worth, Texas to the James Connally Airport in Waco, Texas.

2. To orient and train local personnel in noise measurement methodology and techniques.

3. To orient and train Region VI Environmental Protection Agency personnel in noise measurement methodology and techniques for the purpose of future noise assessments in noise sensitive areas in Region VI.

4. To evaluate a noise measurement methodology developed by Region VI Environmental Protection Agency Noise Program personnel whereby the least expensive equipment could be manned by interested persons after only a minimal amount of training.

5. To further implement the Waco, Texas noise awareness program through lectures and noise measuring demonstrations to high school science classes and other interested local representatives.

VI DESIGN OF MONITORING PROGRAM

Sampling sites were chosen for a variety of reasons; however, most of the sites represent noise sensitive land uses. An effort was also made to choose residential and school sampling sites that are representative of other residential and school areas in the city.

The sites at Elm Mott, Texas State Technical Institute, and Timbercrest were also selected on the basis of their proximity to the James Connally Airport where commercial air-carriers were to begin training operations after the opening of the new Dallas-Fort Worth Airport.

Some areas, such as those surrounding McLennan Community College and Robinson, are projected to experience rapid increases in population density. Data from these sites will assist city planners in developing land uses congruous with existing noise levels. Also, the site near Waco Municipal Airport was selected at the request of Waco city officials because this residential area is being considered for annexation to the city.

Enough sites, 17 in all, were used for data collection to obtain a broad picture of the noise environment of the Waco metropolitan area (Figure 2). Fundamental to this study is the assumption that each sampling site is representative of a homogenous area, and that the data collected at the particular sampling site would be similar to data obtained at other points within that homogenous area if they were used for sampling. To test this assumption, a spatial study of the Timbercrest site was initiated. In the spatial study, data was collected simultaneously at four locations at radius of 1/2 mile from the regular Timbercrest site, where data was also being collected. Then, the four peripheral stations were moved to locations at a 1/4 mile radius from the central Timbercrest site, and data was again collected simultaneously at all five stations.

The schedule for data collection was designed to provide information for both weekend and normal work days. Both day and night data was collected on an hourly basis in order to observe changes in the noise levels as a function of time. Analog magnetic tape recordings were made for the purpose of identifying noise sources. By knowing both the hourly noise levels and the major contributing sources of noise, it would be possible to develop effective controls for noise-generating activities that proved to be a problem. For example, this information would be of the type needed for the city to adopt curfews as part of a new noise control code.

In as many instances as possible within the limitations of manpower and availability of equipment, enough data was collected to obtain the A-weighted Day-Night Average Noise Level. This was done in order to comply with the recommendations for measurement of community noise levels as suggested by the EPA document Public Health and Welfare Criteria for Noise published July 27, 1973.

One of the major objectives of this project was to develop a monitoring methodology within the means of a community of moderate size. To this end, a sample "hand-held" meter station was developed, at which data would be recorded manually. However, to provide a validation of the data obtained by the hand-held meter stations, each site was visited by at least one of two roving stations. These roving stations consisted of a vehicle equipped with precision magnetic tape recording systems and environmental noise classifiers. The tape recordings obtained from the two roving stations also provide a means of identifying the major noise sources, can be examined for the presence of short duration noises which might not be evident from the sampling type of data, and can be used for more thorough analysis than of amplitudes alone, should such scrutiny be necessary for important sources.

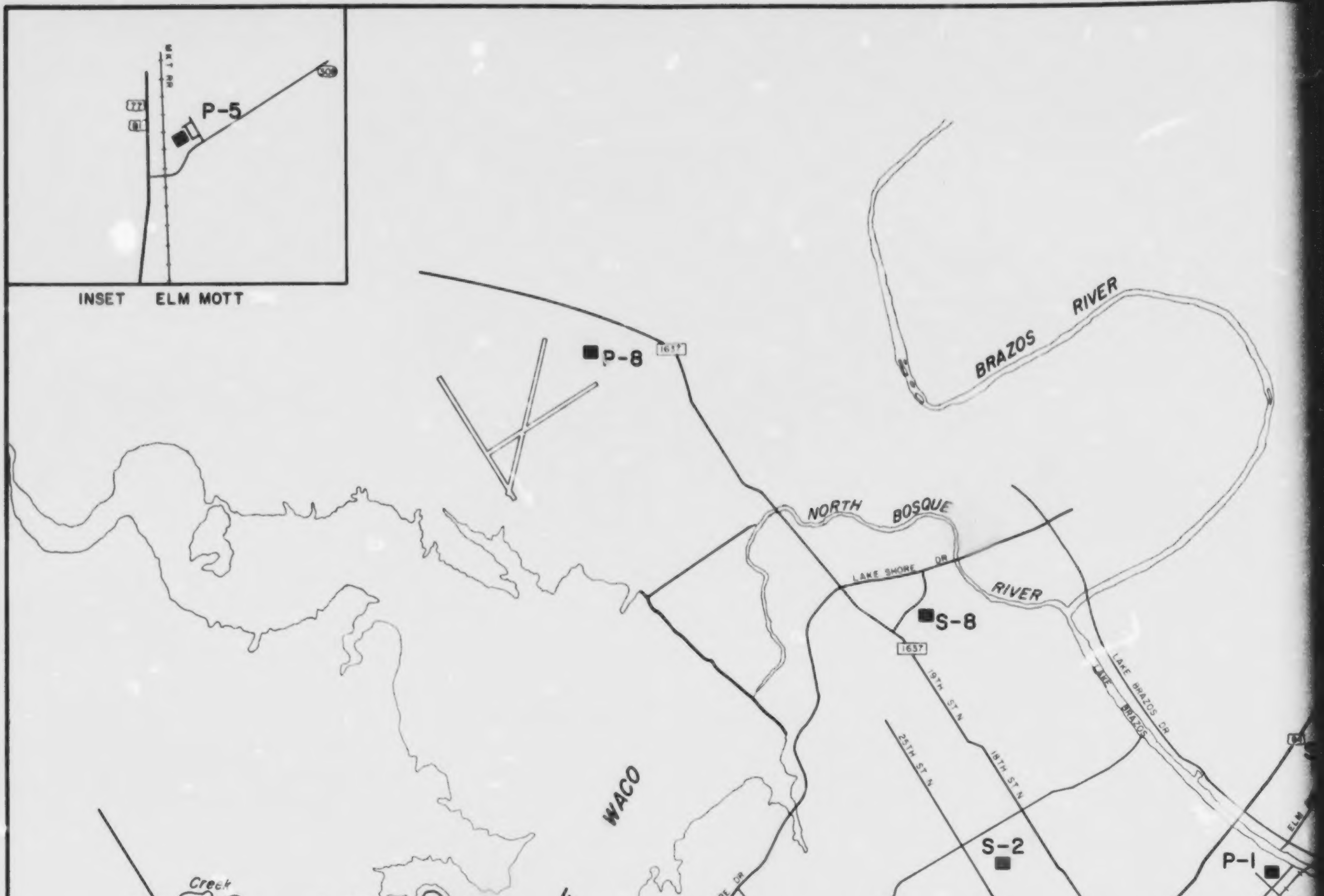


Figure 2. Location of Monitoring Sites

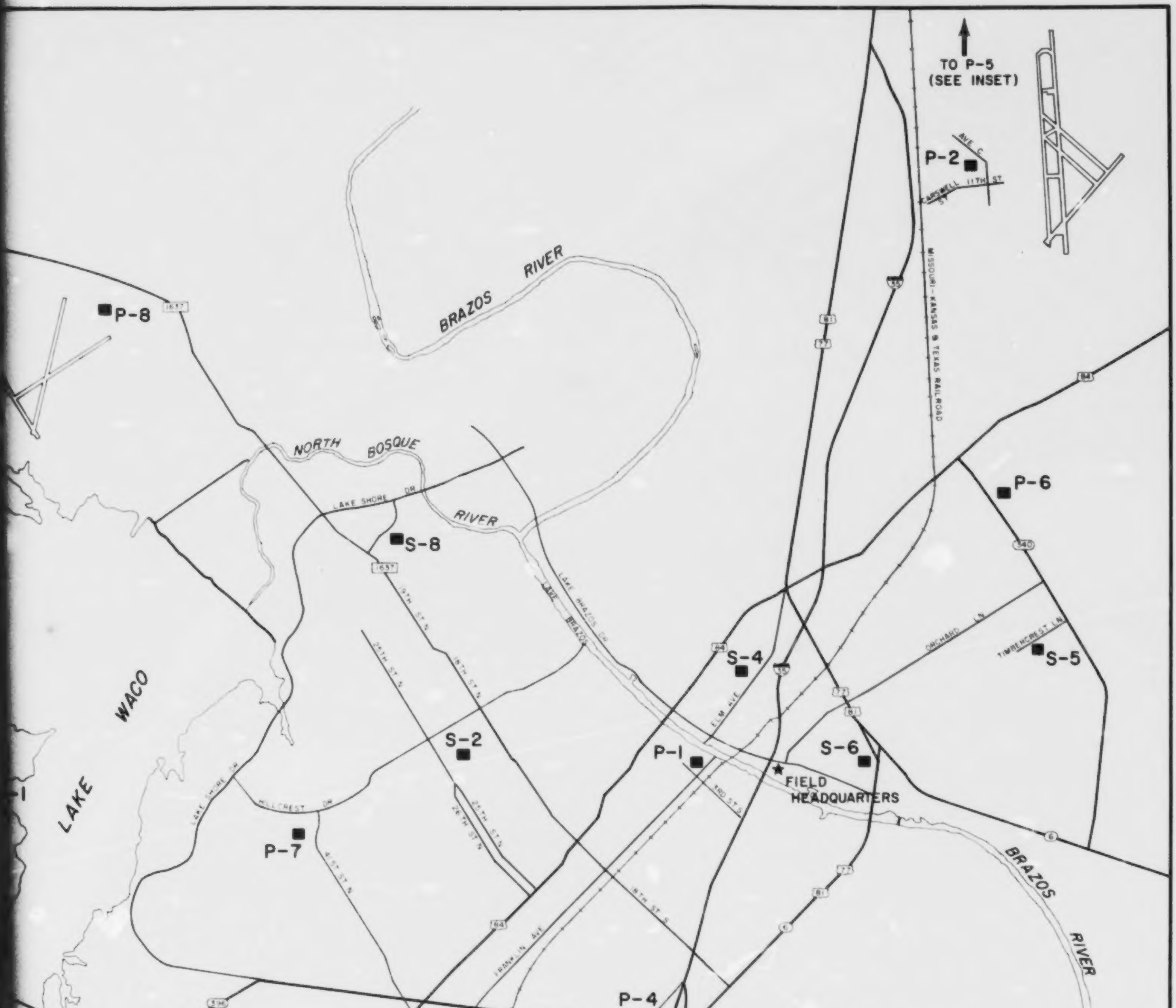


Figure 2. Location of Monitoring Sites

VII DEVELOPMENT OF MONITORING METHODOLOGY

A major objective of this project was to develop and evaluate a noise measurement methodology that utilizes the least expensive of equipment and requires a minimal amount of training for implementation. The noise measurement methodology developed and refined during the course of this project is sufficient for purposes of community noise surveys to assist local governments in city planning and development of noise codes. The equipment is low enough in cost that most cities can afford several stations; and it is simple enough to be operated by high school and college students as school projects. Because these noise monitoring stations may be operated by almost anyone, the noise measurement methodology used for this project may also serve to stimulate public interest and support for noise control activities.

A station consisted of a Type-2 "hand-held" sound level meter that was mounted on a tripod along with a stopwatch. Each station was also equipped with an inexpensive cassette magnetic tape recorder, an acoustical calibrator, and a simple weather station. The station operator was seated in a folding chair and was provided a clipboard for holding the data sheets. For night operation, a simple bracket held two flashlights, one to illuminate the sound level meter and the other to light the data sheet.

At the beginning of each hour of data collection, the sound level meter was calibrated, and the condition of the batteries for the sound level meter were checked. Then, A-weighted noise levels were recorded manually on a data sheet at ten-second intervals. At five-minute intervals, the cassette tape recorder was turned on for about 20 seconds to provide documentation of the types of noise sources. After 20 minutes of data collection, the station operator interrupted the noise data collection to record the weather conditions. A sling psychrometer was used to determine the temperature and relative humidity. The speed and direction of the wind were measured and the sky condition was also noted. After a ten-minute pause, the noise data collection was resumed for another 20 minutes. The final ten minutes of the hour was spent recalibrating the sound level meter, and answering a short questionnaire provided at the top of the data sheet. The purpose of this questionnaire was to identify noise sources and to obtain the station operators'impressions of the noise conditions. A separate data sheet was used for each hour of data collection.

To record the noise data, it was originally intended that the station operator merely place a mark in a small bin belonging to the row on the data sheet that corresponded to the observed noise level. However, a number of station operators began, independently of one another, to refine this system by identifying sources of loud noises in the bins where only a single mark was intended. This was done by placing letters in the bins, each letter corresponding to a particular type of source. Each of these station operators also provided a legend for interpreting his or her own system of lettering somewhere on the data sheet.

In many instances, these stations were operated by a single person for as much as twelve hours in succession. Despite these lengthy shifts, none of the persons involved expressed extreme difficulty in carrying out the monitoring. However, the workload for each member of a two-person team is much more reasonable.

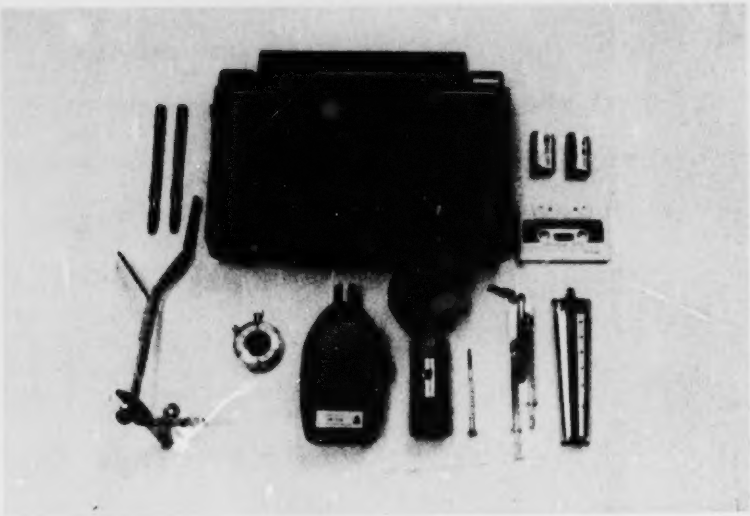


Figure 3. -- Equipment for a "Hand-Held" Meter Station

Table 1.

EQUIPMENT LIST FOR "HAND-HELD METER" STATION

Type-2 Sound Level Meter GR - 1565B)

Windscreen for Sound Level Meter Microphone

Stopwatch with Sweep Second Hand

Tripod

Sony TC-224 Tape Recorder

Magnetic Tape Cassettes

Sound Level Calibrator (B&K 4320)

Screwdriver for Calibration of Sound Level Meter

Weather Station (Sling Psychrometer, Wind Speed Meter, Compass)

Data Sheets

Clipboard

Marking Pens

Spare Batteries for all Equipment

Watch with Time of Day

Three Flashlights (Night Stations)

Flashlight Mounting Bracket (Night Stations)

AMBIENT NOISE SURVEY OF WACO, TEXAS
DATA SHEET

SITE: ________

PERSON: ________

JOB: Waco

DATE OF WEEK: ________ DATE: ________ TIME: BEGIN ______ FINISH: ________

CAL: BEGIN ______ FINISH: ________

______ CK BATTERY

______ METER ON "FAST" POSITION

SKY: ________

WIND: ________

dBA L_{10}: ________

LIMITS, dBA: ________

STATION NO. (Ex. S-1, P-8, etc.)
DAY (1 or 2)
HOUR (0001 to 2400)
RELATIVE HUMIDITY (%)
TEMP (degrees ______)
WIND SPEED (MPH)
WIND DIRECTION (N-1, E-2, S-3, W-4)
BAROMETRIC PRESSURE (mm Hg)

Total # Samples	Upper Limit	L_{10}	Lower Limit
50	1st	5th	10th
100	5th	10th	17th
150	8th	15th	23rd
200	12th	20th	29th
250	16th	25th	35th
300	20th	30th	41st
350	25th	35th	47th

sample from the top

VARIATION AND BACKGROUND

- ______ Low Background
- ______ Med. Background
- ______ High Background
- ______ Very Few Variations
- ______ Some Variations
- ______ Many Variations
- ______ Soft Variations
- ______ Medium Variations
- ______ Loud Variations

OVERALL DESCRIPTION

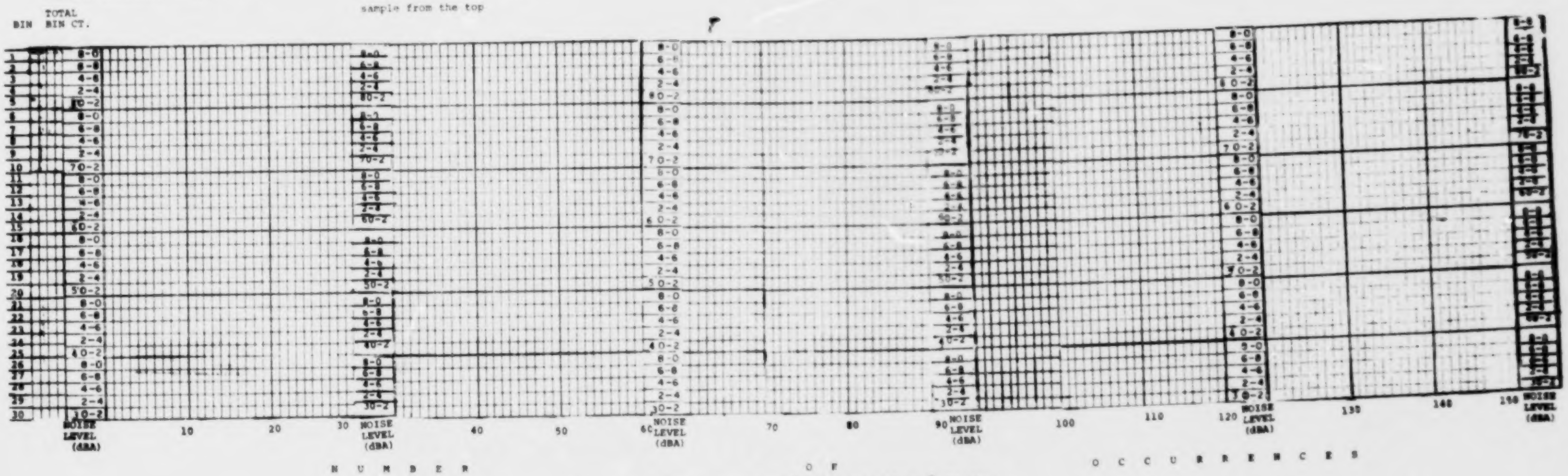
- ______ Quiet & Peaceful
- ______ Some Noise but Pleasant
- ______ Not Always Pleasant Noticeable Noise
- ______ Noisy but Pleasant
- ______ Noisy but Unpleasant
- ______ I would not mind living in such a sound environment
- ______ I would mind living in such a a sound environment

SOURCE QUESTIONNAIRE

Sources: P = Primary
S = Secondary
0 = Not Audible

Emergency Vehicle ________
Light Aircraft ________
Large Aircraft ________
Railroad ________
Truck ________
Construction ________
Automobile ________
Motorcycle ________
Boat ________

Industrial ________
Commercial ________
Residential ________
Music ________
Insects ________
Birds ________
Dogs ________
Recreational ________
Other ____ ________



BIN
TOTAL BIN CT.
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24
25
26
27
28
29
30
8-0
6-8
4-6
2-4
80-2
70-2
60-2
50-2
40-2
30-2
NOISE LEVEL (dBA)
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20
30
40
50
60
70
80
90
100
110
120
130
140
150
N U M B E R O F O C C U R R E N C E S

Figure 4. Data Sheet for "Hand-held Meter" Station

Figure 5. -- Nagra DJ Tape Recorder and B&K Type 2203 Precision Sound Level Meter

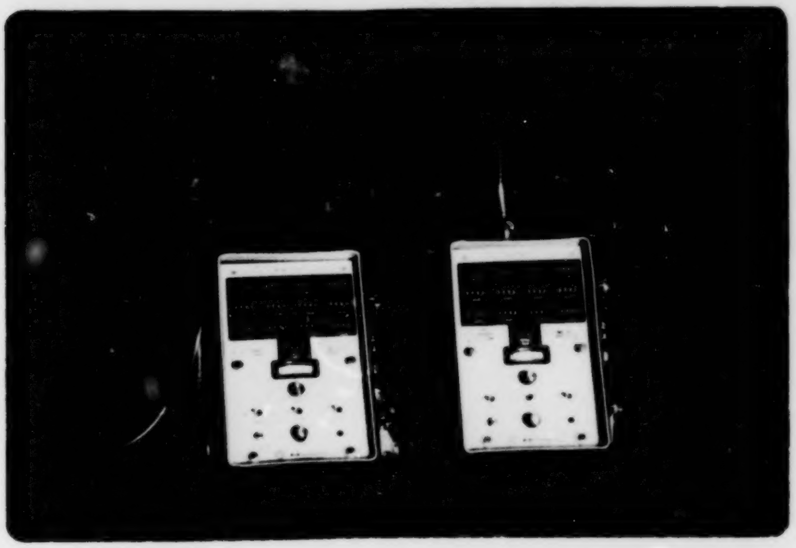

Figure 6. -- B&K Models 166 and 166-S45, Environmental Noise Classifiers

Table 2.

EQUIPMENT LIST FOR "ROVER" STATION

Type-1 Precision Sound Level Meter (B&K 2203)

Condenser Microphone - 1-inch (B&K 4145)

Analog Magnetic Tape Recorder (Nagra DJ)

Environmental Noise Classifiers (B&K Model 166 and Model 166/S45)

Piezoelectric Microphones - 1-inch (B&K 4117)

Calibrators (B&K 4230 and GR 1562)

Inverter - 12 VDC to 117 VAC (Tripplite 1000 FC)

Tripods

Microphone Extension Cable - 100 Feet

Windscreens - 4-inch Diameter

Magnetic Tape - Ampex Type 444 "Low Noise Type"

Storage Cells - 12 VDC Marine Type

Batteries - 1 1/2 VDC - Alkaline Type

Flashlights

Extension Cords

Data Sheets

Stopwatch with Sweep Second Hand

Hand-Tools

VIII DISCUSSION

Data Reduction Methods

A total of 442 hourly data sheets were collected from the hand held stations. All of the pertinent data from each sheet were transferred to computer coded forms according to a predetermined format. Then computer cards were punched from the forms. Included as input to be stored, manipulated, and printed were site and date, hour, weather, major and minor noise sources, and the number of data samples taken at each noise level. Outputs computed included L_{max}, L_{01}, L_{10}, L_{50}, L_{90}, L_{99}, L_{min}, TNI, L_{np}, and L_{eq} statistics which were computed for each hour from approximately 230 data samples of the dBA sound pressure levels taken at 10 second intervals. Daily statistics were also computed and included all of the above plus the L_{dn}. Besides the level statistics, correlation coefficients were computed over the hourly statistics L_{10}, L_{50}, and L_{eq} to determine to what degree if any these statistics were interdependent. A copy of the computer program used to reduce the hand-held meter station data can be seen in Appendix G along with sample input and output data for one site (S-5 Timbercrest).

Data from the environmental noise classifiers were recorded by hand onto special data sheets for each sampling hour. Like the data from the hand-held meter stations, these data represented the number of occurrences accummulated within amplitude bins of 2 or 3 dB width. However, the sample rate of the classifiers is 6 samples over a ten second period rather than 1 sample per ten second period as for the hand-held stations. Two classifiers operating together provide 24 amplitude level bins with two overlapping - or 22 individual bins with sample counters. These data were transferred to coded forms and then to punched cards and reduced by digital computer. The computer program for the classifier data reduction can be seen in Appendix H along with sample input and output. Like the hand-held meter data, statistics were computed for each hour. Daily statistics were not computed since the classifiers did not stay at any one location more than two hours.

Analog magnetic tape data were stored for later playback analysis. This type of data is highly desirable since there are a number of different types of analyses which can be performed with it. In this study the tapes were played back through the classifiers on A-weighting and the resulting classifier data reduced by the classifier computer program.

Results of Data Reduction

A sampling time schedule for each of the 16 sites can be seen in Appendix A. The schedule includes hand-held meter sampling periods and periods during which the rover stations were taking magnetic tape data and classifier data.

Statistical noise levels for each site-day can be seen in Appendix B along with detailed site descriptions in the form of photographs, maps, and population statistics.

A comparison of the individual site noise levels for each day was made with certain criteria levels which have been identified as significant for their importance with regard to communication interference and hearing protection. This comparison can be seen in Appendix K in which levels and time periods deemed important by the Federal Highway Administration, U.S. Department of Transportation, by EPA Office of Noise

Abatement and Control, and by the Department of Housing and Urban Development are displayed. In the table, an asterisk has been used to note when a criteria has been equaled or exceeded by a site noise level daily average. It should be noted that only one site did not equal or exceed any of the criteria during either sampling day. This was S-1 Speegleville Park, a summer recreational area which was desolate during this period. A rank ordering of the sites in order of lowest number of exceedances to highest number of exceedances can be seen in Appendix L. Famililarity with these sites leads one to the conclusion they are also rank-ordered according to degree of vehicular traffic, an ordering which was expected.

To compare weekend day noise levels with week day noise levels, site-ensemble averages for each day were calculated by combining the daily noise sample populations of all sites, after normalizing the data for each site so that each site received equal emphasis, and calculating L_{10}, L_{50}, and L_{eq} for the combination. The results can be seen in Table 3 in which the L_{50}, L_{10}, and L_{eq} appear to be less for weekend days especially Sunday. However, the differences are admittedly small. Note that the average for each day is within ± 2.8 dBA of the EPA identified level of 55 dBA for communication interference and well below the 75 dBA level identified for hearing protection.

Throughout the investigation, certain noise level statistics appeared to be highly correlated with others. To test this, correlation coefficients were calculated within 99% confidence limits for each site among the statistics L_{10} and L_{eq}. These coefficients can be seen in Tables 4 & 5. Mean coefficients also calculated can be seen. From these calculations a very high correlation between L10 and L_{eq} emerged and less significant correlations between L_{10}-L50, and L_{50}-L_{eq} for most sites. The exceptions were sites and times where the noise distributions showed small time fluctuations about the background level. The correlations for sites S-1 and S-2 are low, due mainly to the lack of sufficient number of hours of data to compute meaningful coefficients within 99% confidence limits, and these sites were not included in Table 4.

The results of data reduction of magnetic tape records and classifier records from the mobile (rover) stations can be seen in Appendixes D and C respectively. A comparison of the noise level statistics L_{10}, L_{50}, and L_{eq} for tape and classifier stations at times when both were operating simultaneously can be seen in Tables 6 and 7 in the form of absolute differences between the statistics at each site and time. A total of 28 comparisons yielded mean absolute differences for the secondary stations of 1.6 dBA for the L_{10}, 1.3 dBA for the L_{50}, and 2.0 dBA for the L_{eq}. For the primary stations mean absolute differences were 2.0 dBA for L_{10}, 1.5 dBA for L_{50}, and 1.4 dBA for L_{eq}. Thus, the two methods of measurement are in reasonable agreement.

A comparison of the tape noise level statistics L_{10}, L_{50}, and L_{eq} with those derived from the hand-held meter data can be seen in Table 8 in the form of differences in the two sets of statistics at each site and time where sampling times were coincident. Mean absolute differences of 1.9 dBA for the L_{10}, 1.0 dBA for the L_{50}, and 1.7 dBA for the L_{eq} over a total of 24 sampling periods indicate that within reasonable statistical and experimental accuracy that the hand-held meter method is sufficient for measurement of the statistical noise levels. This assumption is based on the assumed superior precision and accuracy of the analog magnetic tape method.

Spatial Sampling Study

Four hand-held meter stations were positioned on the circumference of a circle 1/2 mile in radius with the center at station S-5, Timbercrest. At the center, a rover station recorded noise levels on tape during which the hand meter stations recorded noise levels. The process was repeated for a circle 1/4 mile in radius also. Location of these stations can be seen in Appendix I.

The results of the data reduction of the spatial sampling tests can be seen in Tables 9 and 10. Comparisons of the noise level statistics L_{10}, L_{50}, and L_{eq} yielded differences between the individual site value and the average value of all four circumferential values plus the central station value. These differences can be seen in Tables 9 and 10. The mean of the absolute differences for the noise level statistics are: L_{10}, 2.4 dBA; L_{50}, 1.2 dBA; and L_{eq}, 2.4 dBA for the outer circle and L_{10}, 2.7 dBA; L_{50}, 0.9 dBA; and L_{eq}, 2.6 dBA for the inner circle. Thus, the central station is representative of the area within reasonable limits of experimental and statistical accuracy. The Timbercrest site and surrounding area can be considered to be "spatially homogeneous" with regard to noise levels within $\pm$ 2.7 dBA.

Evaluation of Cassette Tape Source Identification Method

During all of the hand-held meter data gathering, a twenty-second tape recording of the background noise was taken at five minute intervals. Eight recordings were made each hour with a twenty minute pause for weather data gathering and recalibration of instruments.

After the survey was completed, the tapes were played back and the sources of noise identified for each site and hour. No attempt was made to establish noise levels. The list of sources taken from listening to the cassette tapes was compared to the list compiled by the data gatherers in the field. Based on this comparison the following several conclusions were drawn from twenty hours of tape.

1. A significant number of major sources identified by data gatherers were not represented on the cassettes. This is probably due to the recording sampling period being too short and too infrequent. Few sources such as sirens were identified from tapes that data gatherers had not listed.

2. There was too much station operator noise, such as shuffling of data sheets, talking, and squeaking of chairs which tended to mask background noise sources.

This could be avoided by use of a remote microphone placed several feet from the station. This would also improve the omnidirectionality of the microphone.

3. There was too much wind noise caused by use of built-in microphone without a windscreen. A windscreen on a remote microphone would solve this problem.

4. Low level background noise and sources were almost indistinguishable.

5. Site and time voice identification on tape is necessary for data sheet correlations.

Based on the above observations, the cassette tape recordings were not judged to be reliable source identifiers. However, the method could be greatly improved by sampling at a higher rate - say once each minute for six seconds (10:1 time compression) and using an external, omnidirectional microphone with windscreen. A higher rate of sampling would require an automatic turning off and on of the recorder by an intervalometer. This would increase the complexity of station operation and the cost per station by about $70.00.

Effects of New Noise Sources

As seen in Appendix K, sites S-1, P-3, P-8, S-5, P-2, P-5, and P-6 all enjoy low noise level exposure as indicated by the L_{dn}'s being just at or less than the EPA identified level of 55. These sites are also ones which could experience significant changes in noise exposure should large commercial jet aircraft flyovers be initiated in the site areas. S-1, P-3, and P-8 could suffer from increased commercial airline traffic in and out of Waco Municipal Airport while noise levels at S-5, P-2, P-5, and P-6 could be affected by nighttime "touch and go" commercial jetliner practice runs began at Texas State Technical Institute in January 1974. The extent of the noise impact depends on the type of aircraft flown, the flight paths, the flight operations, the number of flights per day and per night, and atmospheric conditions. An assessment of this impact should be made by a followup noise survey at these critical sites.

Noise Reduction in Waco

Control of noise emitted from vehicular traffic sources would be a significant contribution toward reduction of the few areas currently impacted by such sources. This, plus careful planning and zoning to keep major sources from impacting residential areas in the future, could be achieved by a comprehensive noise control ordinance aimed at source level controls and proper land use zoning. Further cooperative efforts between the City of Waco and the Region VI U.S. Environmental Protection Agency could achieve this goal in a minimum time without disruption of normal business, recreational, and residential activities. The noise data gathered during this noise monitoring study can supply needed background information to support such an ordinance.

Table 3.

DAILY AVERAGES OVER ALL SITES

	Fri.,Nov.30	Sat.,Dec.1	Sun.,Dec.2	Mon.,Dec.3
L_{max}	81	79	81	81
$L_{.1}$	71	73	77	75
L_{10}	61	59	57	59
L_{50}	53	49	47	51
L_{90}	43	43	41	43
L_{99}	41	39	37	39
L_{eq}	57.8	55.6	54.8	56.9
No. Sites	8	8	8	8
No. Hours	87	89	133	133

Total hours of data collection = 442

TABLE 4.

CORRELATION OF NOISE LEVELS FOR SECONDARY STATIONS

SITE	DATE	r_1 L_{10} & L_{eq}	r_2 L_{50} & L_{eq}	r_3 L_{10} & L_{50}
S-4	11/30	.881	.847	.712
S-4	12/1	.740	.652	.566
S-5	11/30	.938	.748	.723
S-5	12/1	.840	.467	.520
S-7	11/30	.910	.848	.912
S-8	11/30	.974	.762	.717
S-8	12/1	.994	.925	.937
	Mean Absolute Correlation	.897	.750	.727

Table 5.

CORRELATION OF NOISE LEVELS FOR PRIMARY STATIONS

SITE	DATE	r_1 L_{10} & L_{eq}	r_2 L_{50} & L_{eq}	r_3 L_{10} & L_{50}
P-1	12/2	.930	.817	.820
P-1	12/3	.822	.613	.820
P-2	12/2	.937	.513	.470
P-2	12/3	.974	.928	.912
P-3	12/2	.916	.667	.483
P-3	12/3	.926	.778	.634
P-4	12/2	.980	.909	.903
P-4	12/3	.935	.620	.541
P-5	12/1	.986	.955	.891
P-5	12/2	.935	.774	.876
P-5	12/3	.820	.648	.933
P-6	12/2	.881	.850	.871
P-6	12/3	.910	.834	.934
P-7	12/2	.936	.862	.933
P-7	12/3	.827	.492	.645
P-8	12/2	.861	.465	.558
P-8	12/3	.879	.612	.698
Mean Absolute Correlation		.91	.73	.76

Table 6.

TAPE DATA AND CLASSIFIER DATA DIFFERENCES

SECONDARY STATIONS

SITE	DATE	TIME	ΔL_{10}	ΔL_{50}	ΔL_{eq}
S-1	11/30	21.00-22.00	2.5	0	0.5
S-2	11/30	12.45-13.29	5.0	0	2.5
S-3	11/30	15.30-16.15	2.5	2.5	3.2
S-3	12/1	16.45-17.26	2.5	0	0.3
S-4	11/30	03.30-04.13	0	2.5	0.5
S-4	12/1	15.30-16.20	0	2.5	0.7
S-5	12/1	13.00-13.43	5.0	2.5	0.8
S-6	11/30	06.15-07.00	0	0	0.1
S-7	11/30	18.40-19.20	2.5	2.5	1.8
S-7	12/1	06.35-07.20	0	0	0.8
S-7	12/1	07.35-08.20	0	0	0.2
S-8	11/30	09.20-10.05	0	0	0.2
S-8	12/1	21.40-22.20	2.5	2.5	1.6
Mean Absolute Difference			1.6	1.3	2.0

Table 7.

TAPE DATA AND CLASSIFIERS DATA DIFFERENCES

PRIMARY STATIONS

SITE	DATE	TIME	ΔL_{10}	ΔL_{50}	ΔL_{eq}
P-1	12/2	13.08-13.50	0	0	0.4
P-1	12/3	14.50-15.40	0	0	0.2
P-2	12/2	12.10-12.50	0	0	0.3
P-3	12/2	09.05-09.52	5	2.5	4.2
P-3	12/2	10.05-10.52	5	2.5	2.3
P-3	12/2	22.50-23.35	0	2.5	0.8
P-4	12/2	15.36-16.22	5	2.5	3.1
P-4	12/3	16.26-17.15	2.5	2.5	2.3
P-4	12/3	17.29-18.15	5	2.5	2.9
P-5	12/3	17.16-18.00	0	0	1.1
P-5	12/3	22.33-24.05	2.5	2.5	2.1
P-6	12/2	16.25-17.07	2.5	2.5	0.6
P-7	12/2	17.08-17.52	2.5	0	0.1
P-7	12/3	19.15-20.15	0	0	0.2
P-8	12/3	15.30-16.32	0	2.5	0.6
Mean Absolute Difference			2.0	1.5	1.4

Table 8.

"HAND-HELD METER" VS. TAPE DIFFERENCE FOR 24 CASES OF COINCIDENT SAMPLING HOURS

SITE	DATE	TIME	ΔL_{10}	ΔL_{50}	ΔL_{eq}
P-1	12/2	13.06-13.49	1.0	-4.0	-2.2
P-1	12/3	15.00-15.43	1.5	3.0	2.1
P-2	12/2	12.11-12.53	4.5	3.0	3.8
P-2	12/2	13.15-13.55	0.0	-1.5	-0.5
P-2	12/3	01.40-02.25	0.5	-3.0	1.2
P-3	12/2	22.52-23.33	1.5	-1.0	0.6
P-3	12/2	10.05-10.51	-0.5	-1.0	0.0
P-3	12/3	09.05-09.50	-2.5	-1.0	-2.1
P-5	12/1	23.21-24.05	2.0	1.0	2.1
P-5	12/1	22.13-22.56	0.5	0.5	-1.1
P-6	12/3	16.25-17.07	-0.5	3.0	-1.6
P-6	12/2	03.30-03.44	-5.0	0.5	-1.3
P-7	12/2	17.08-17.52	3.0	-0.5	1.9
P-8	12/3	15.43-16.26	4.0	1.5	2.9
P-8	12/2	18.07-18.50	-1.0	-1.5	-1.1
S-1	12/1	09.20-10.05	0.0	0.5	1.6
S-2	12/1	13.10-13.57	-3.0	-1.5	-2.5
S-4	11/30	16.19-17.01	1.5	1.0	1.6
S-5	12/1	13.00-13.43	-0.5	2.5	-1.7
S-5	11/30	12.46-13.29	-1.0	0.5	-0.1
S-5	11/30	00.43-01.30	4.5	1.5	2.4
S-6	11/30	06.15-07.01	-2.5	-3.0	-2.8
S-8	11/30	10.20-10.59	1.0	0.0	2.1
S-8	11/30	09.20-10.05	3.0	-0.5	1.9
Mean Absolute Deviation			1.9	1.0	1.7

Table 9.

SPATIAL HOMOGENEITY OF THE TIMBERCREST SITE

OUTER ZONE

Mean Absolute Differences Over Three-Hour Test Period

SITE	$(\Sigma\|L_{10}-\bar{L}_{10}\|)/3$	$(\Sigma\|L_{50}-\bar{L}_{50}\|)/3$	$(\Sigma\|L_{eq}-\bar{L}_{eq}\|)/3$
A-1	2.4	0.9	4.2
B-1	4.0	1.7	3.1
C-1	3.3	2.3	2.3
D-1	2.0	0.5	1.6
Central	0.5	0.6	0.6
Mean Absolute Deviation	2.4	1.2	2.4

NOTE: A bar over the level statistic, such as $\bar{L}_{10}$, indicates an average over all five sites.

Table 10.

SPATIAL HOMOGENEITY OF THE TIMBERCREST SITE

INNER ZONE

Mean Absolute Difference Over Three-Hour Test Period

SITE	$(\Sigma\|L_{10}-\bar{L}_{10}\|)/3$	$(\Sigma\|L_{50}-\bar{L}_{50}\|)/3$	$(\Sigma\|L_{eq}-\bar{L}_{eq}\|)/3$
A_2	2.3	0.8	2.2
B_2	2.9	0.8	2.0
C_2	3.7	1.2	3.0
D_2	1.6	0.8	2.3
Central	3.1	1.1	3.4
Mean Absolute Deviation	2.7	0.9	2.6

NOTE: A bar over the level statistic, such as $\bar{L}_{10}$, indicates an average over all five sites.

IX GLOSSARY

dB - Decibel --- Ten times the logarithm to base ten of a quantity divided by a reference quantity.

Lp - Sound Pressure Level --- Decibel measure of the mean square sound pressure referenced to a root mean square sound pressure of 2×10^{-5} nt/m^2.

A-Weighting --- An electrical filter network employed in sound level meters to cause a meter to filter out very low and very high frequency components of sound so that the instrument response is closely correlated with human response to sound.

dBA --- Sound pressure level measured after signal has been A weighted.

Type 2 Sound Level Meter --- A sound level meter which meets or exceeds the American National Standards Institute Standard S1.4 - 1971 for Type 2 General Purpose Sound Level Meters.

L_{10} --- The sound pressure level in dB(A) which is exceeded ten percent of the time.

L_{50} --- The sound pressure level in dB(A) which is exceeded fifty percent of the time.

L_{90} --- The sound pressure level in dB(A) which is exceeded ninety percent of the time.

L_{eq} --- Energy average sound pressure level in dB(A) over a known sampling period. It represents a constant sound pressure level which yields the same overall sound energy during the sampling period as all of the sources did which were actually present and causing a time varying sound level. It is computed from the following formula:

$$L_{eq} = 10 \log_{10} \left(\frac{1}{\sum_{i=1}^{N} S_i} \sum_{i=1}^{N} S_i \, 10^{L_i/10} \right)$$

where L_i is the sound pressure level observed for S_i occurrences or over time S_i. N represents the number of different discrete levels the sound pressure level scale is divided into. $\sum_{L=1}^{N} S_i$ represents the total number of occurrences or total sampling time.

L_{dn} --- A day-night weighted twenty-four hour energy average sound pressure level. It is computed like the L_{eq} except that a 10 dB is added to levels summed over night-time period 2200 - 0700 hours. The formula is:

$$L_{dn} = 10 \log_{10} \left(\frac{1}{D} \sum_{d=1}^{N} S_d 10^{L_d/10} + \frac{1}{B} \sum_{n=1}^{N} S_n 10^{\frac{L_n+10}{10}} \right)$$

where L_d is the sound pressure level observed for S_d occurrences of the total number D of day occurrences at all N levels during the fifteen hour period from 0700 - 2200. L_n is the sound pressure level observed for S_n occurrences of the total number B of night occurrences, at all N levels during the nine hour period from 2200 - 0700.

L_{np} --- Noise Pollution Level - computed from the formula:

$$L_{NP} = L_{50} + (L_{10} - L_{90}) + \frac{(L_{10} - L_{90})^2}{60}$$

TNI --- Traffic Noise Index - computed from the formula:

$$TNI = 4(L_{10} - L_{50}) + L_{90} - 30$$

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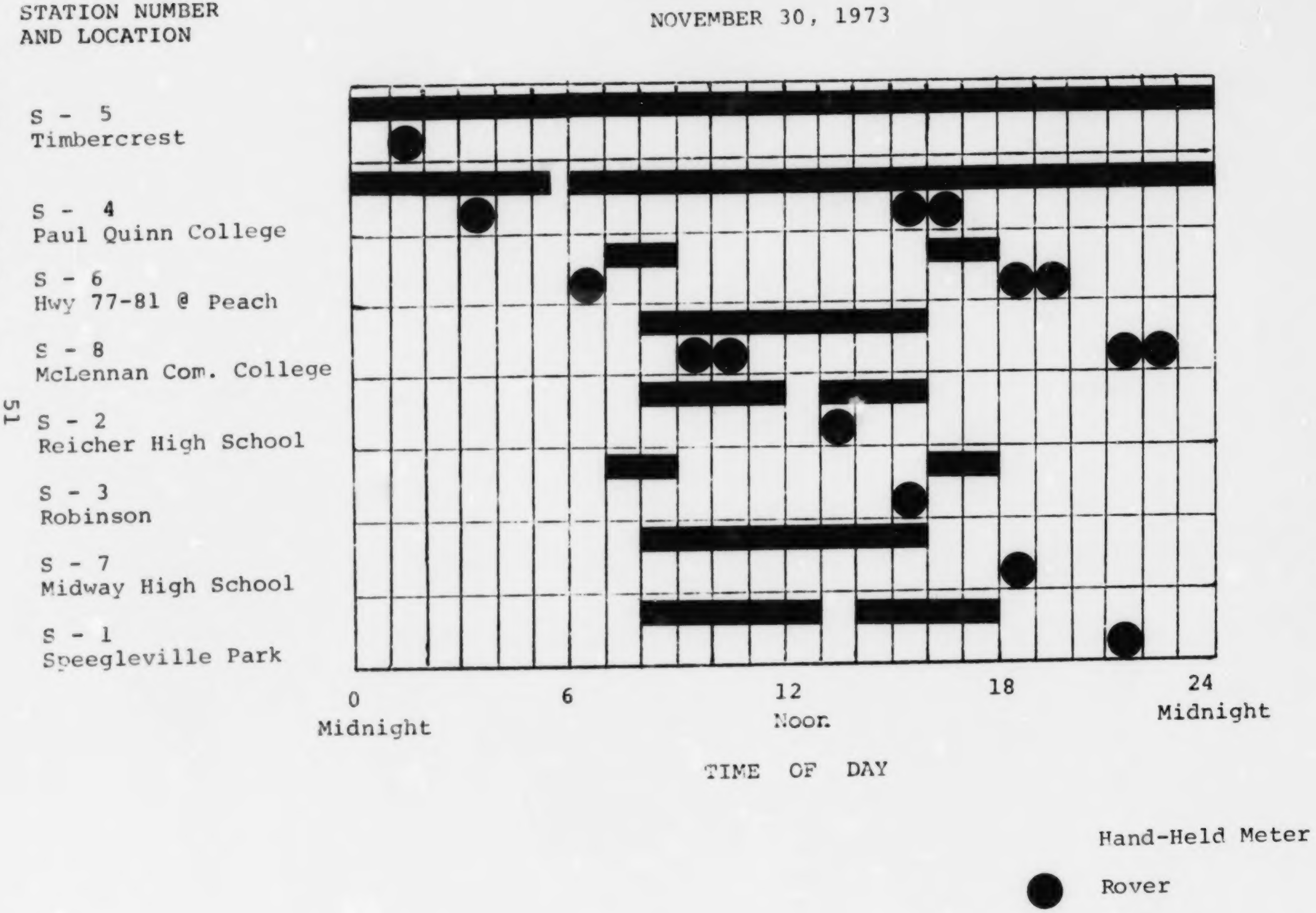
MONITORING SCHEDULE

NOVEMBER 30, 1973



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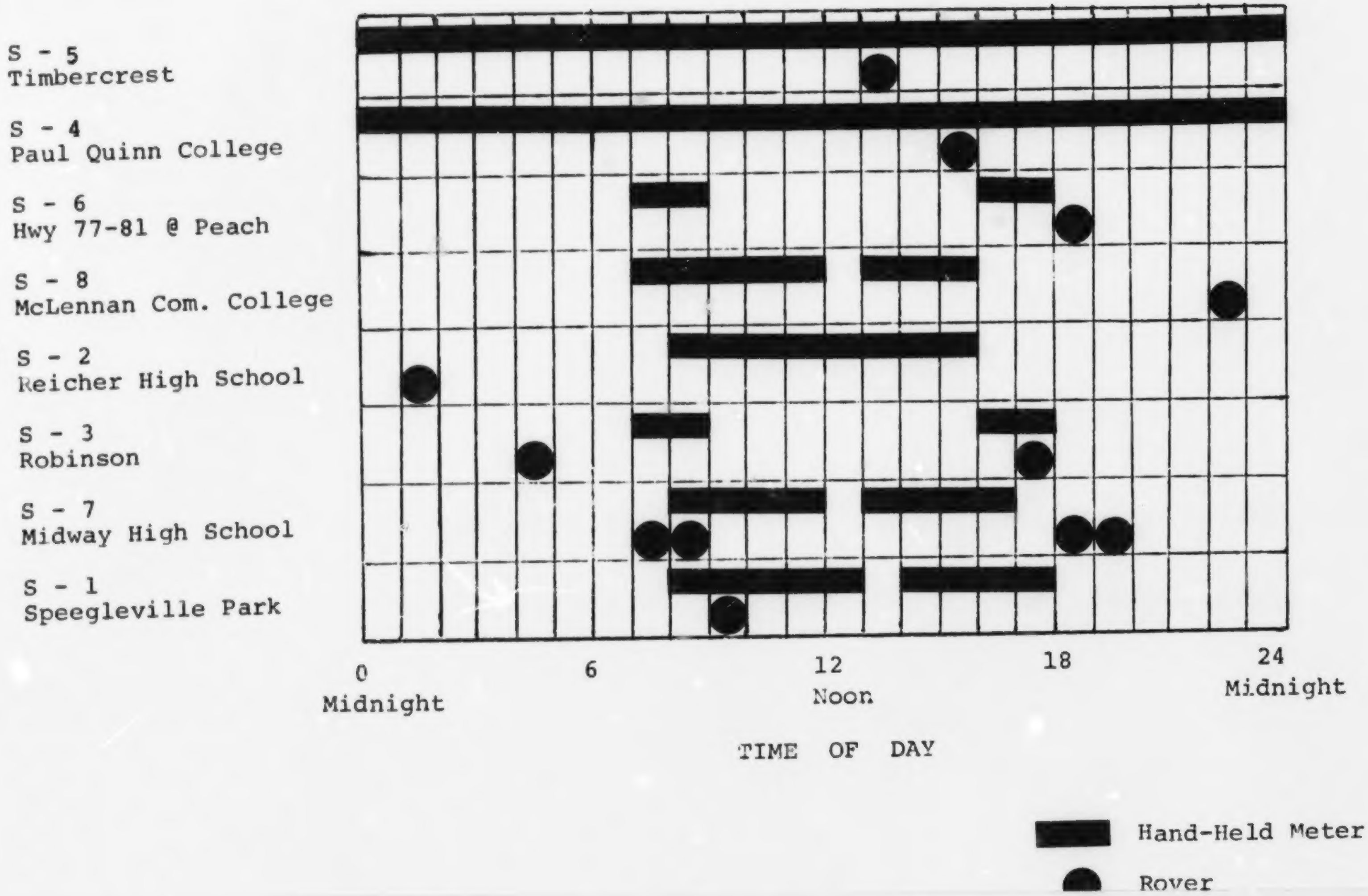
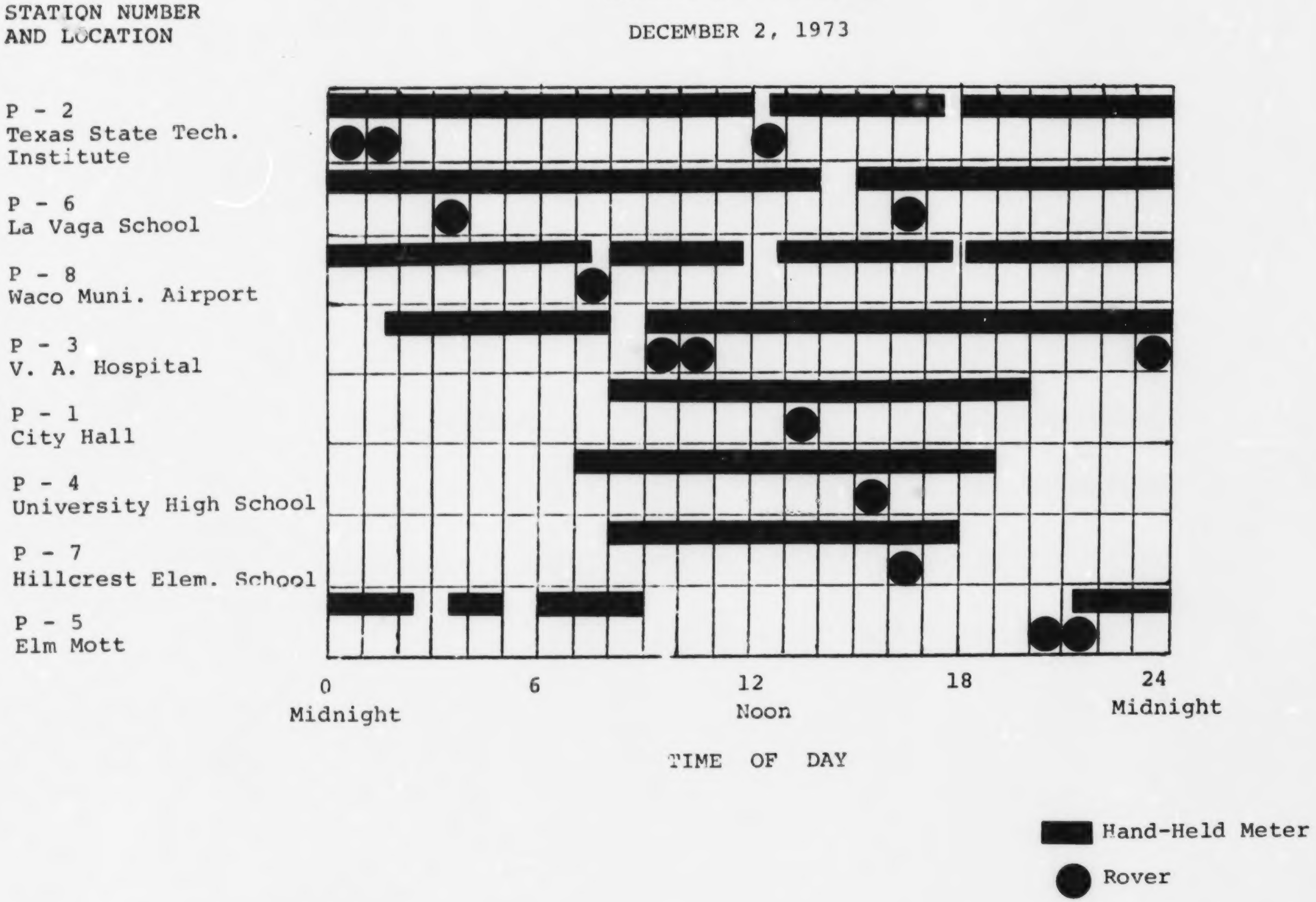
MONITORING SCHEDULE

DECEMBER 1, 1973



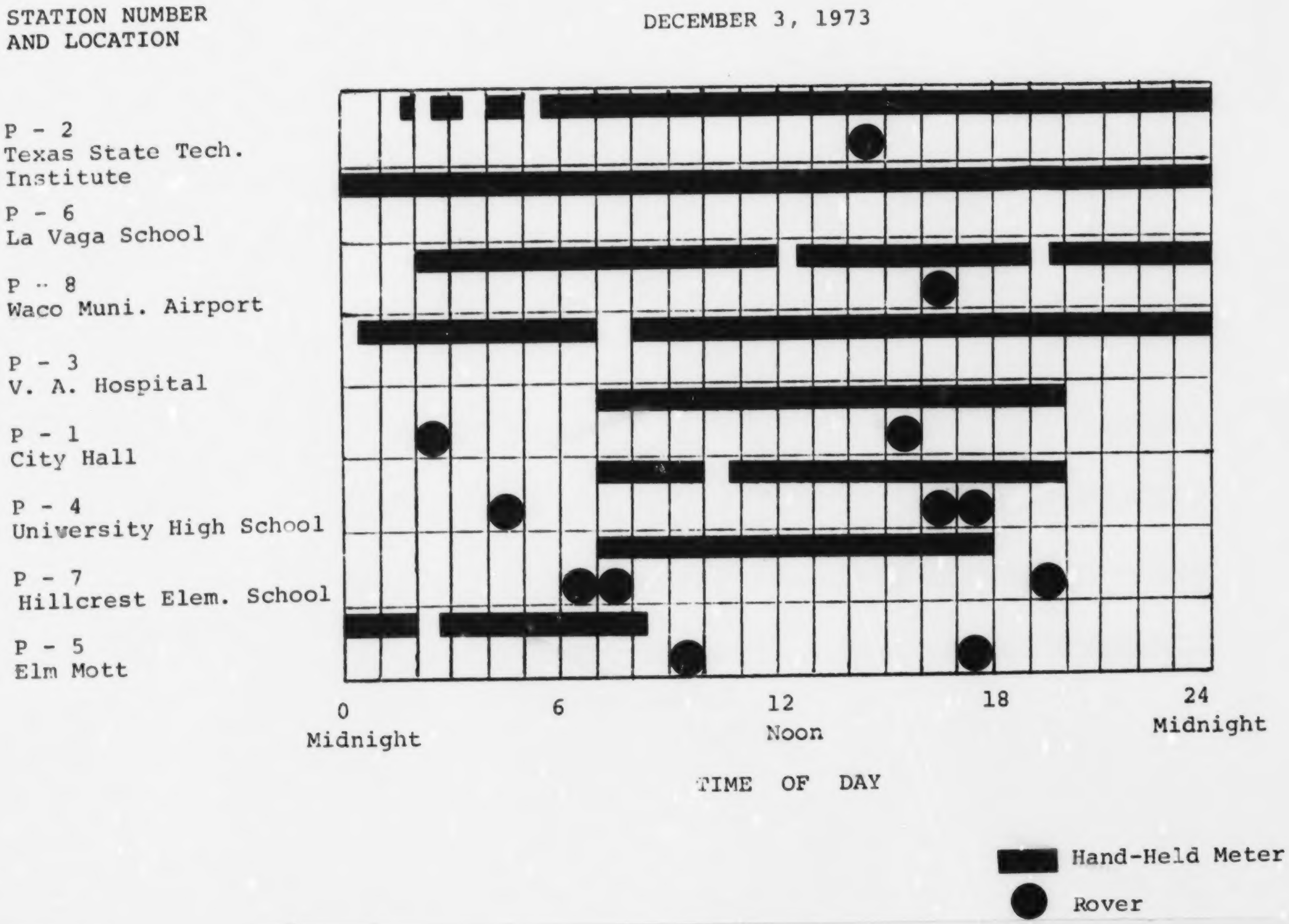
MONITORING SCHEDULE

DECEMBER 2, 1973



MONITORING SCHEDULE

DECEMBER 3, 1973



APPENDIX B

SITE DESCRIPTIONS AND NOISE LEVEL INFORMATION

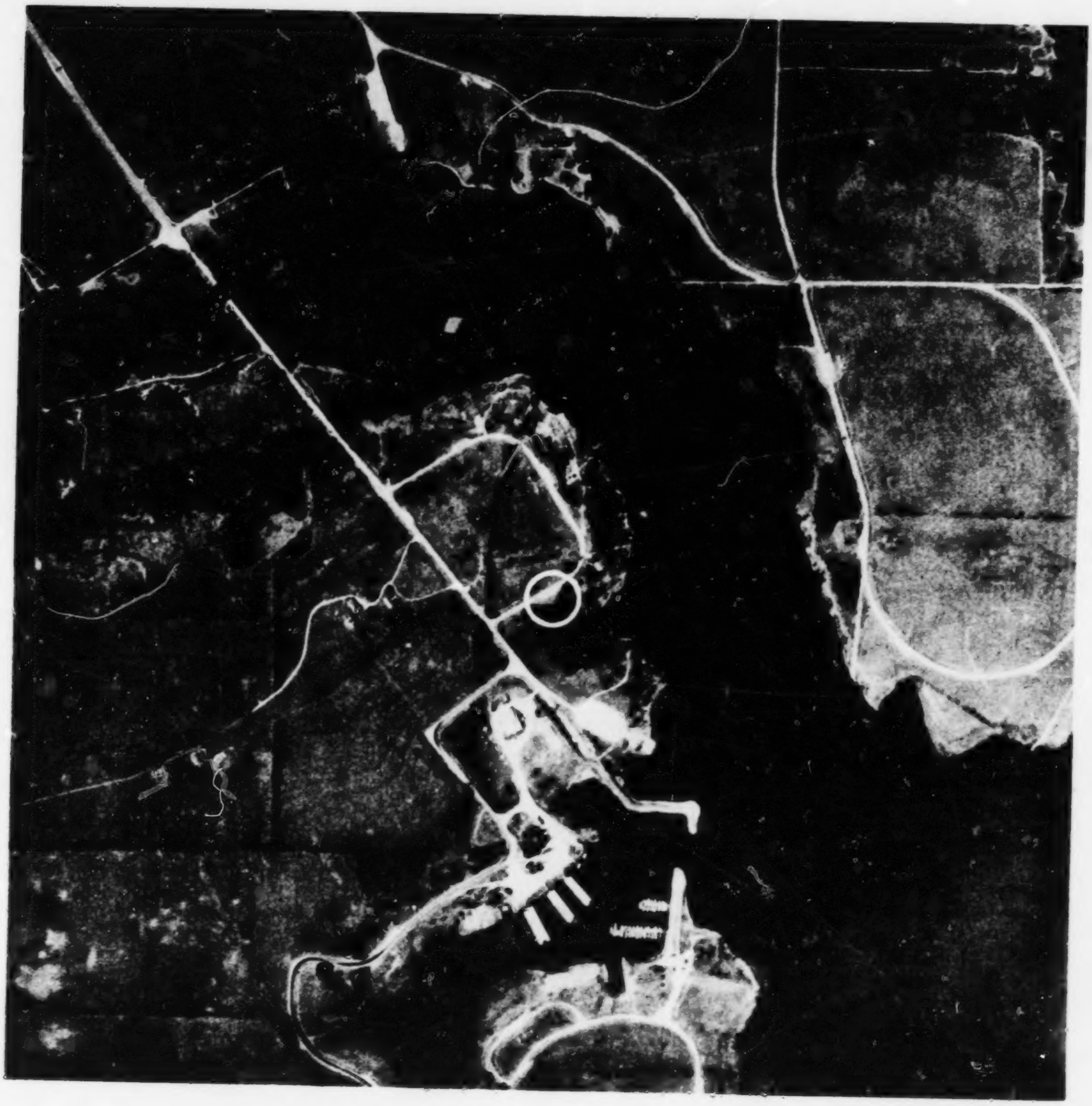
S-1 SPEEGLEVILLE PARK

Population: outside available census tract

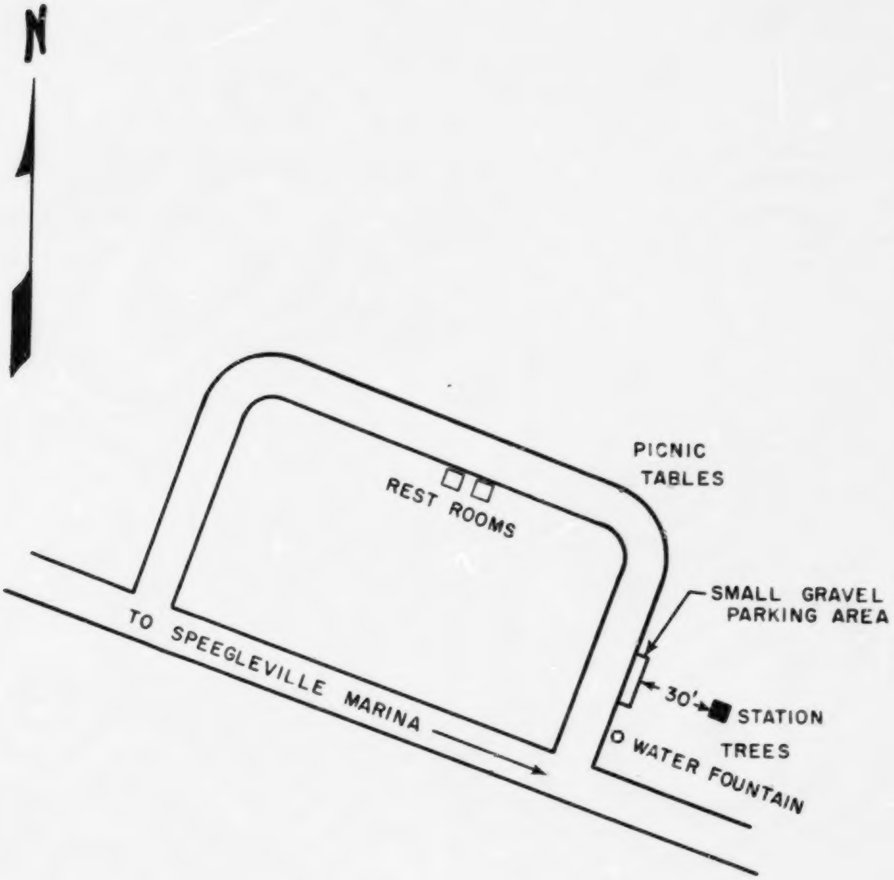
Traffic Count (per day)	Location	1971	1980(est.)
	south of site, Hwy. 6	4250	14120

I. Land Use
The land use near the city is that of a park bordering on Lake Waco. The only permanent dwellings are those of a marina where over 100 houseboats, speedboats, and sailboats are berthed.

II. Noise Sources
Major: Light and large aircraft, construction, automobile, truck, boat, motorcycle
Minor: Birds, insects, people



Aerial photograph of S-1.
Monitoring site is circled.



S—1 SPEEGLEVILLE PARK

HOURLY "HAND-HELD METER" NOISE DATA AT S-1

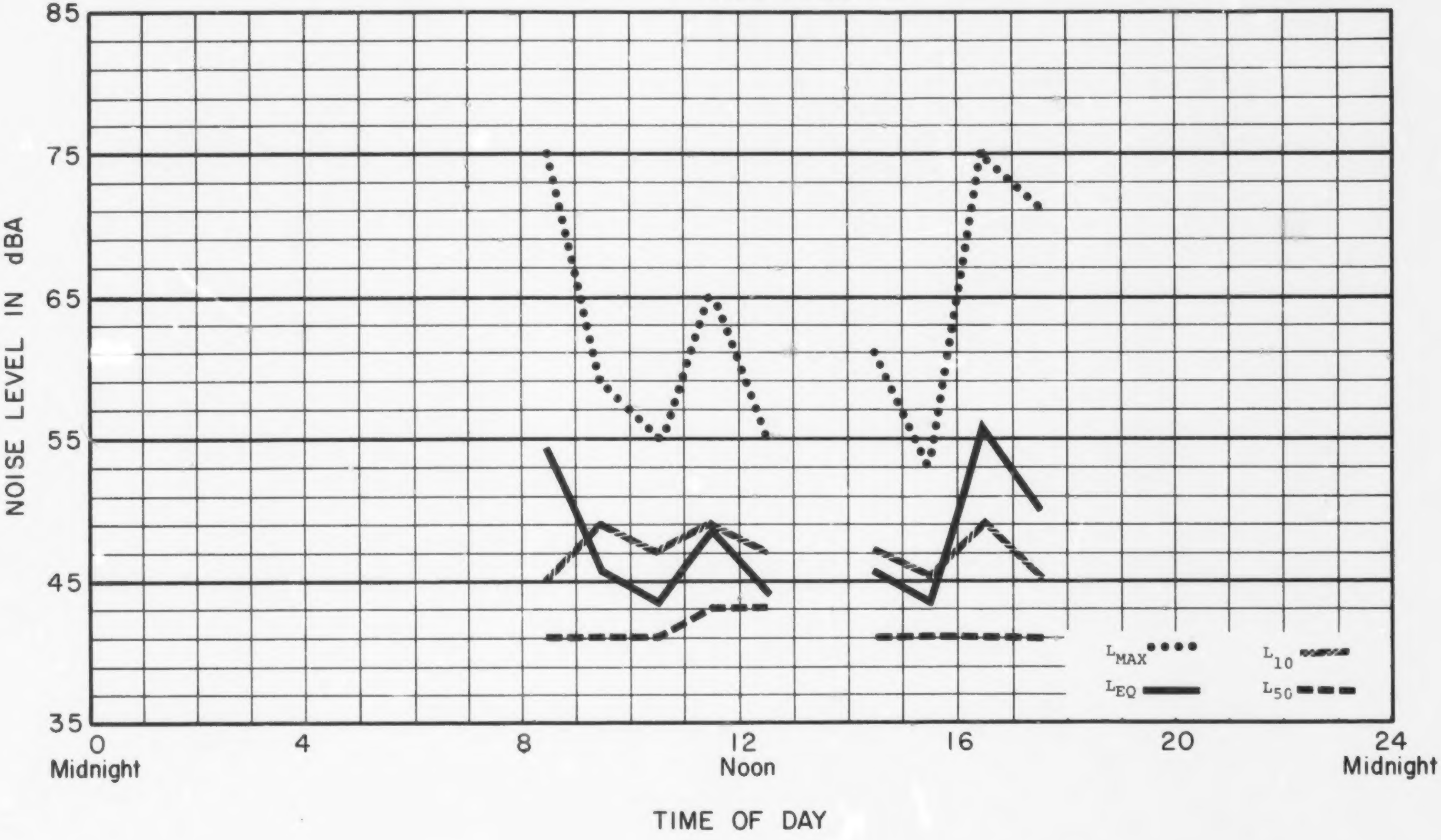
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
9.00 - 10.00	11	56	49	41	39	59	45.9	55.9	49.0
10.00-11.00	15	49	47	41	39	55	43.5	51.7	41.0
11.00-12.00	15	41	49	43	39	65	48.4	60.1	49.0
12.00-13.00	14	32	47	43	39	55	44.2	51.9	41.0
14.00-15.00	17	34	47	41	39	61	45.4	54.9	41.0
15.00-16.00	16	38	45	41	39	53	43.2	50.6	33.0
16.00-17.00	15	45	49	41	39	75	55.7	71.4	49.0
17.00-18.00	13	56	45	41	39	71	50.2	62.0	33.0

SUMMARY OF NOISE LEVELS AT S-1 FOR NOVEMBEP 30, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 47 L_{50} = 41 L_{90} = 39
L_{EQ} = 50.2 L_{DN} = 50.2 L_{NP} = 61.2 TNI = 41.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-1

DECEMBER 1, 1973

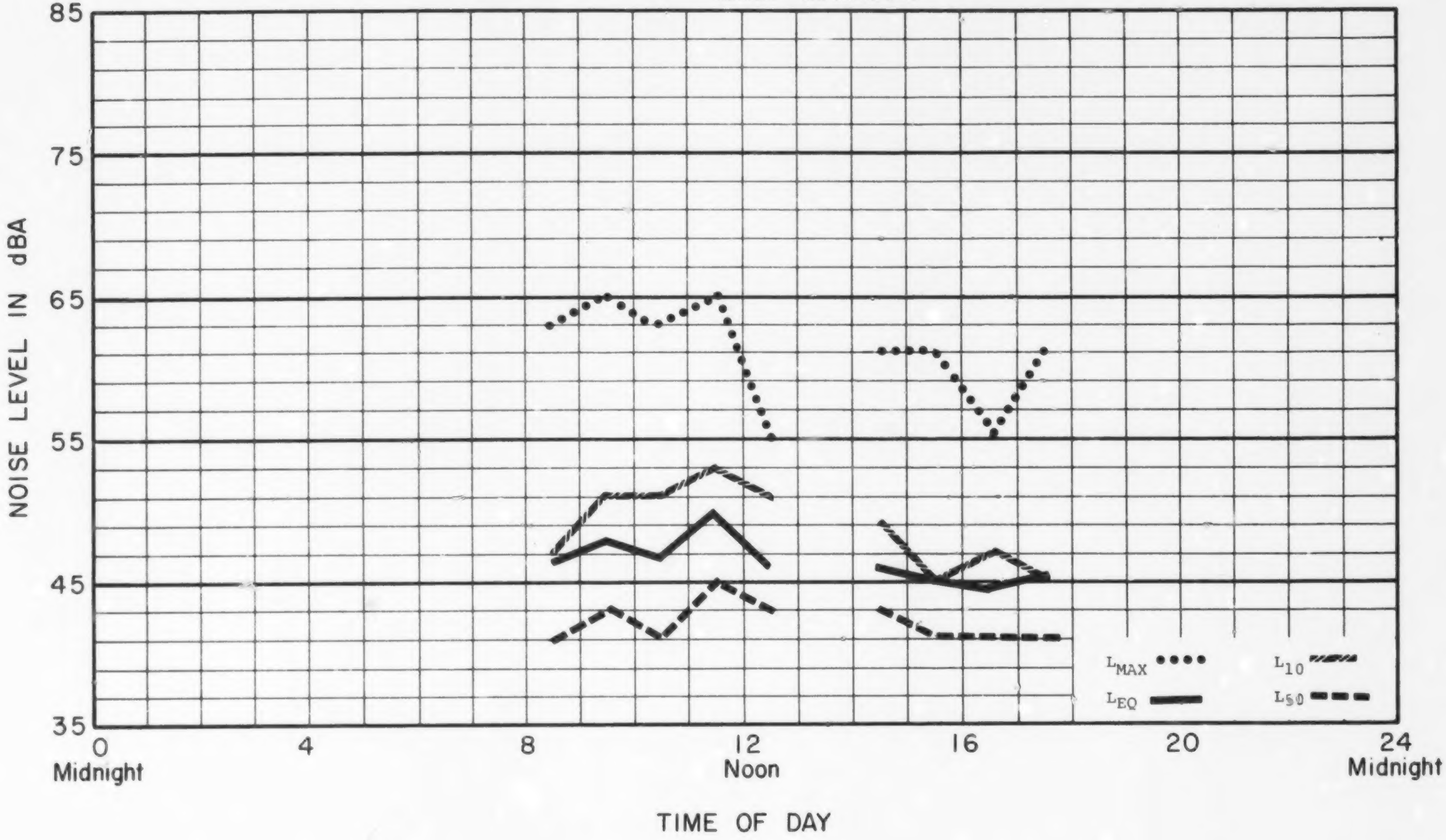
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 9.00	3	89	47	41	39	63	46.5	57.5	41.0
9.00 -10.00	6	80	51	43	39	65	48.1	60.5	57.0
10.00-11.00	9	72	51	41	39	63	46.7	58.7	57.0
11.00-12.00	15	59	53	45	39	65	49.9	62.9	51.0
12.00-13.00	14	53	51	43	41	55	46.0	56.2	51.0
14.00-15.00	14	50	49	43	41	61	46.2	55.5	43.0
15.00-16.00	15	50	45	41	39	61	45.0	53.9	33.0
16.00-17.00	13	53	47	41	39	55	44.5	53.8	41.0
17.00-18.00	11	59	45	41	39	61	45.5	55.3	33.0

SUMMARY OF NOISE LEVELS AT S-1 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 65 L_{10} = 49 L_{50} = 41 L_{90} = 39

L_{EQ} = 46.8 L_{DN} = 46.8 L_{NP} = 58.1 TNI = 49.0

HOURLY INFORMATION



S-2 REICHER HIGH SCHOOL

Population: 1960 - 7438
(Census Tract #11) 1970 - 6106
1995 - 6065 (est.)

Traffic Count	Location	1971	1980 (est.)
	(1)	7320	10550

I. Land Use

Census Tract #11 drawing depicts the land use showing the areas of:

A. Low density residential is made up of middle and lower middle class dwellings.
B. Commercial sections are primarily small stores, shopping centers and service stations.
C. Public and semi-public sections are two churches and two schools.

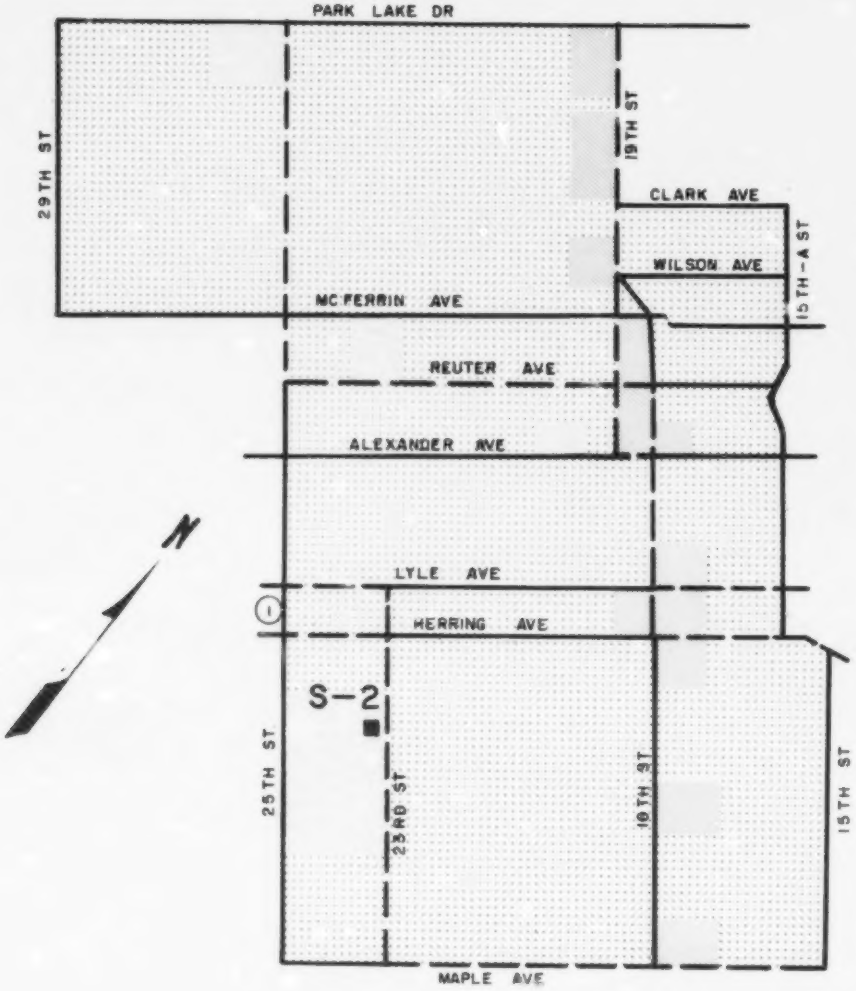
II. Traffic Count

The traffic count sites are located on the drawing and the municipal bus routes through the area are shown.

III. Noise Sources

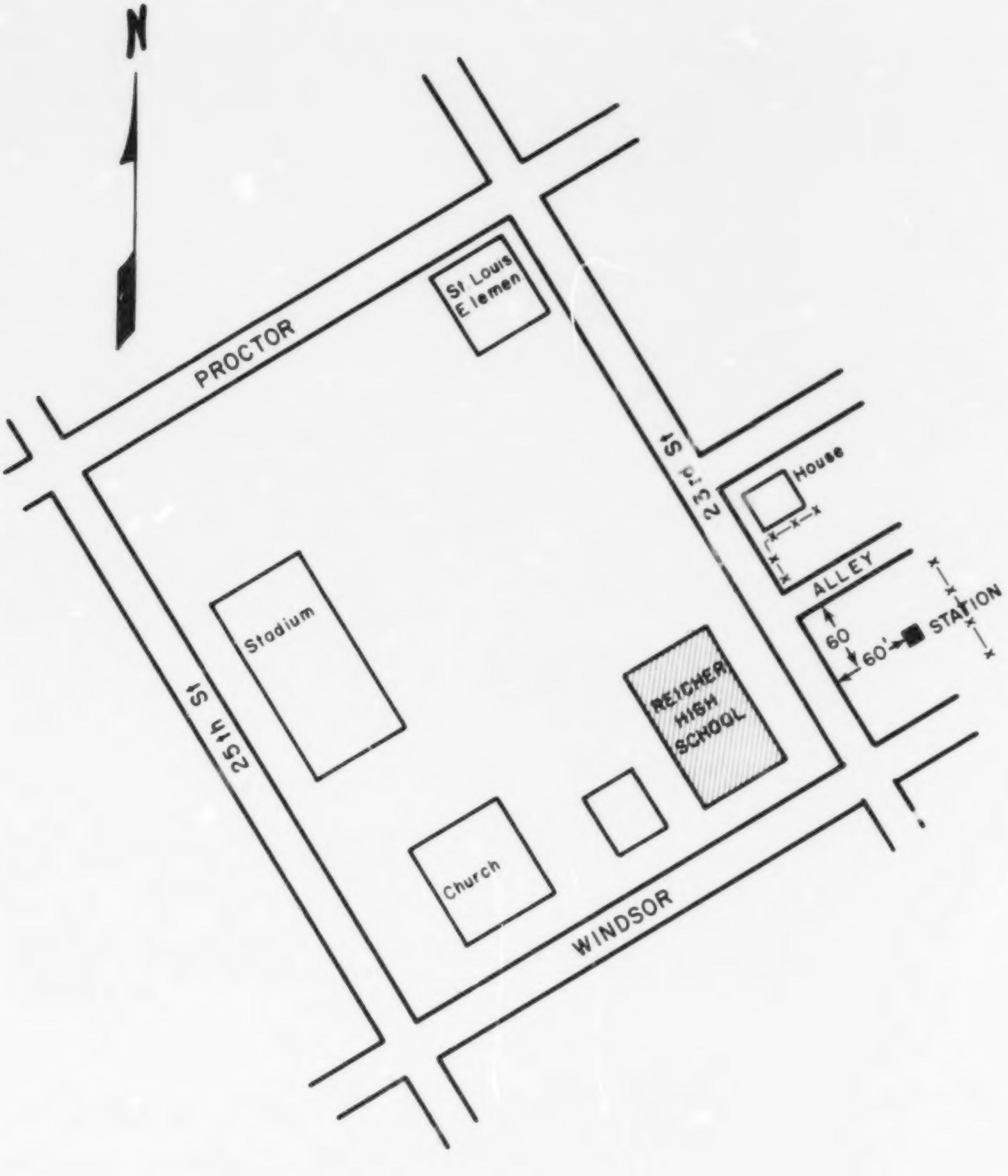
Major: Automobile, birds, students
Minor: Light aircraft, truck, motorcycle, bird dogs, emergency vehicle, residents

CENSUS TRACT NO. 11

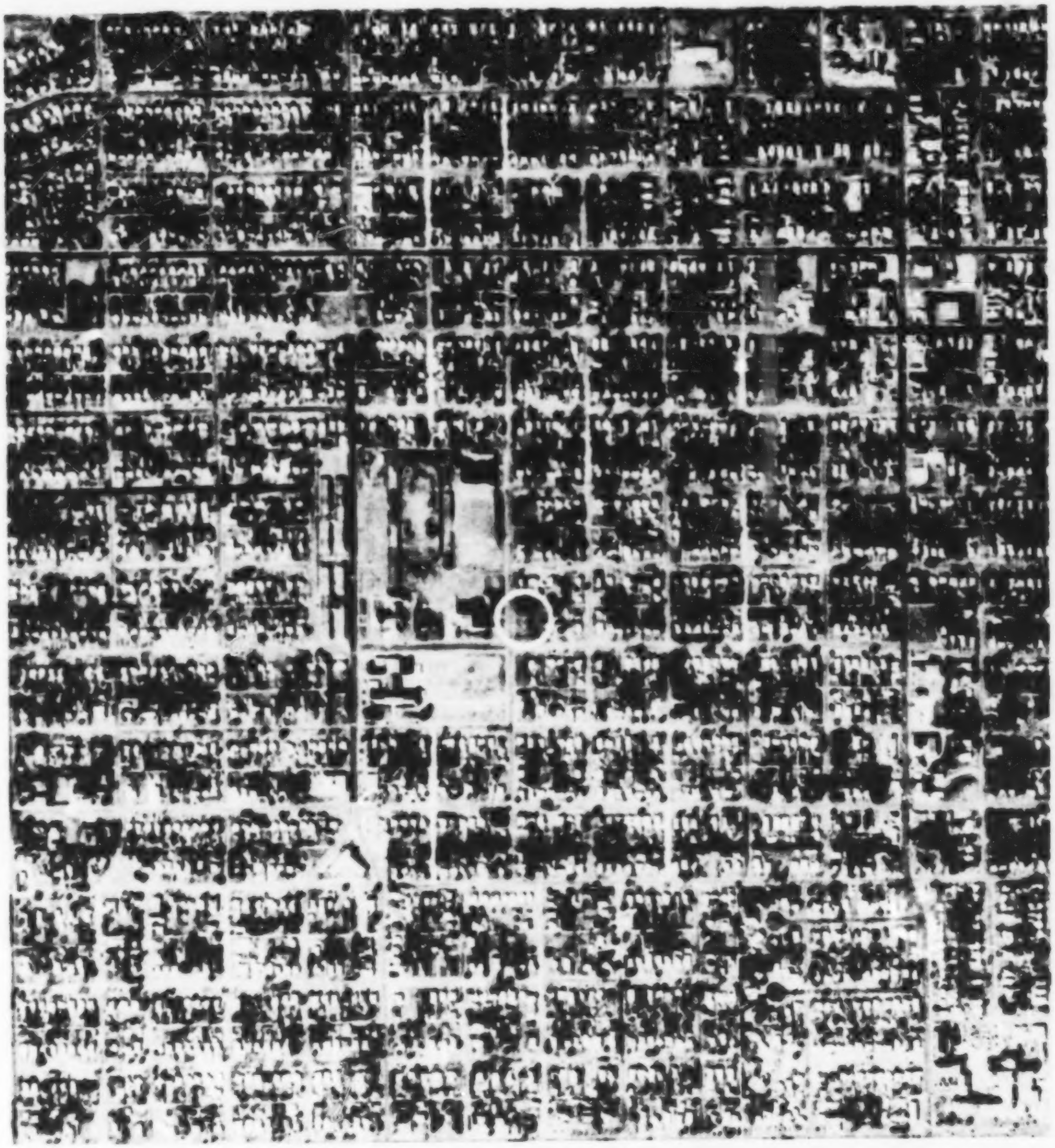


LEGEND

- ░ LOW DENSITY RESIDENTIAL
- ▨ COMMERCIAL
- ☐ PUBLIC & SEMI-PUBLIC
- ① TRAFFIC COUNT SITE
- - - - BUS ROUTE



S-2 REICHER HIGH SCHOOL



Aerial photograph of S-2
Monitoring site is circled.

HOURLY "HAND-HELD METER" NOISE DATA AT S-2

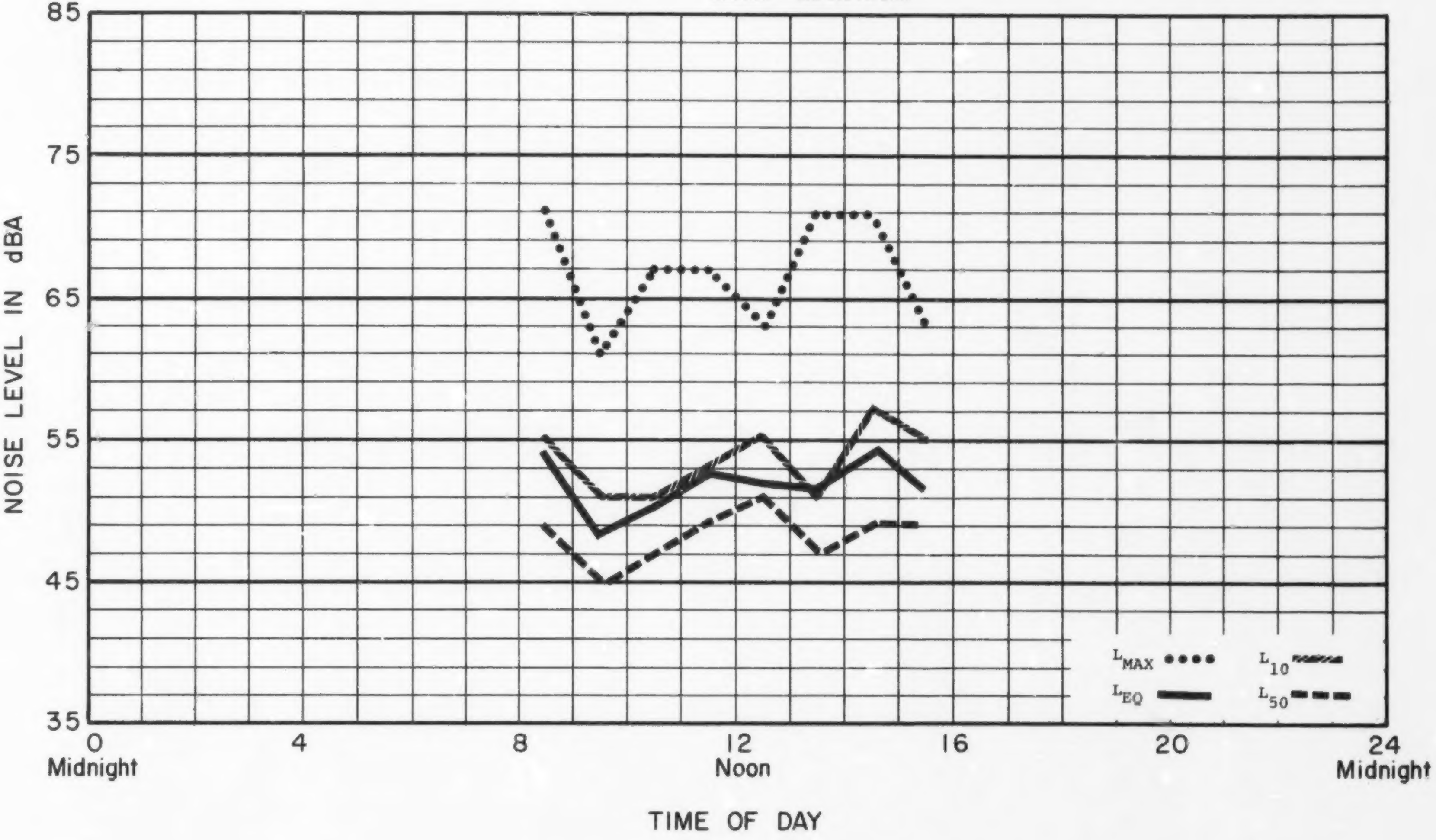
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 9.00	9	65	55	49	45	71	54.0	66.4	55.0
9.00 -10.00	11	56	51	45	43	61	48.2	56.7	45.0
10.00-11.00	15	49	51	47	45	67	50.3	58.6	39.0
11.00-12.00	15	41	53	49	45	67	52.8	63.2	47.0
12.05-13.05	14	32	55	51	47	63	52.3	61.0	49.0
13.05-14.05	14	31	51	47	45	71	51.7	60.2	39.0
14.05-15.05	17	34	57	49	45	71	54.4	66.2	63.0
15.05-16.05	16	38	55	49	45	63	51.6	60.7	55.0

SUMMARY OF NOISE LEVELS AT S-2 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 71 L_{10} = 53 L_{50} = 49 L_{90} = 45
L_{EQ} = 52.3 L_{DN} = 52.3 L_{NP} = 62.7 TNI = 47.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-2

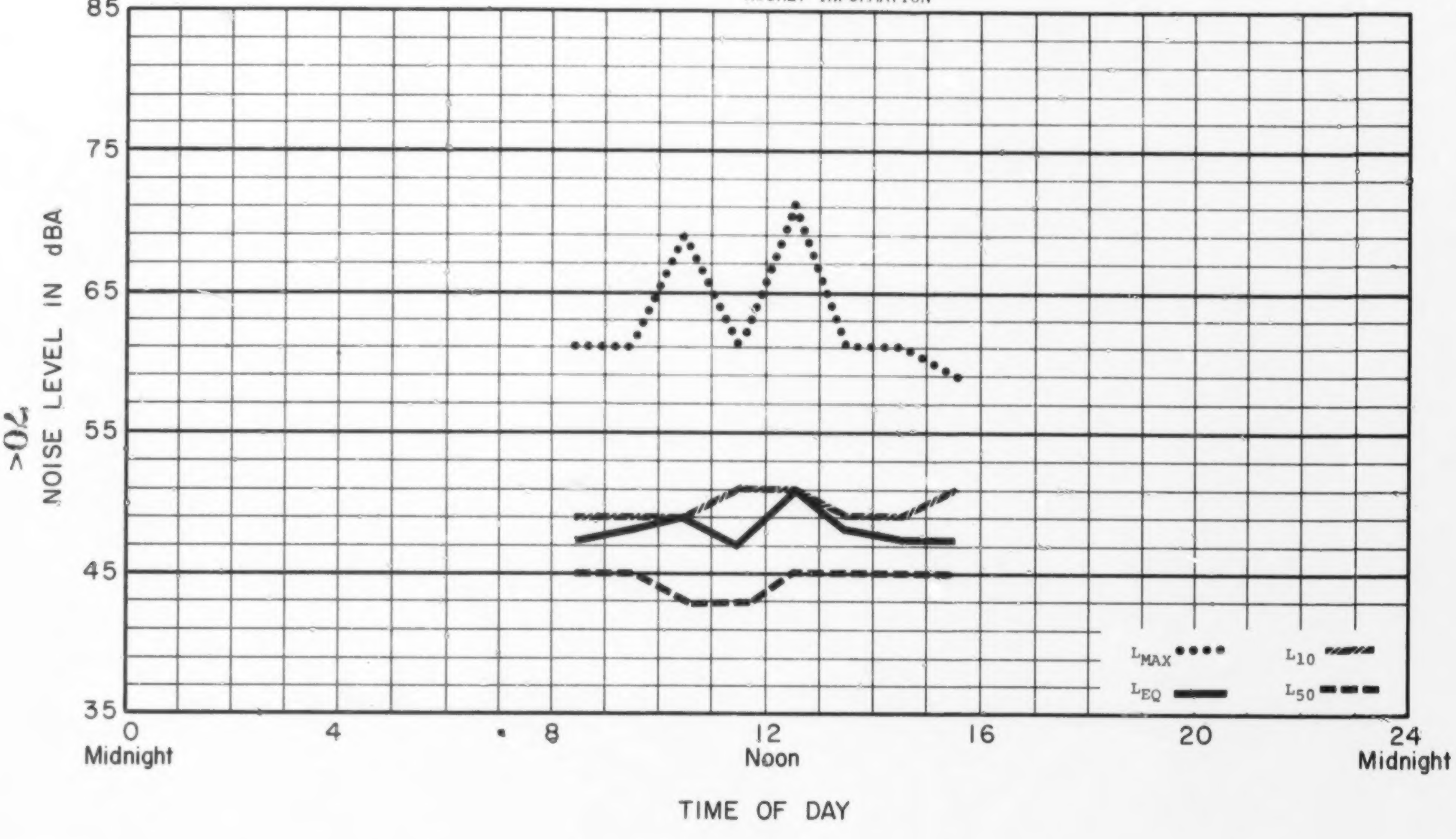
DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 9.00	3	89	49	45	43	61	47.4	53.7	37.0
9.00 -10.00	6	80	49	45	43	61	48.1	56.5	37.0
10.00-11.00	9	72	49	43	41	69	49.1	58.2	43.0
11.00-12.00	15	59	51	43	41	61	47.1	56.6	51.0
12.00-13.00	14	53	51	45	41	71	51.2	62.1	51.0
13.00-14.00	16	50	49	45	43	61	48.2	56.4	37.0
14.00-15.00	14	50	49	45	43	61	47.5	56.1	37.0
15.00-16.00	15	50	51	45	43	59	47.5	55.6	45.0

SUMMARY OF NOISE LEVELS AT S-2 FOR DECEMBER 1, 1973

DAILY INFORMATION:
L_{MAX} = 71
L_{10} = 49
L_{50} = 45
L_{90} = 43
L_{EQ} = 48.4
L_{DN} = 48.4
L_{NP} = 57.3
TNI = 37.0

HOURLY INFORMATION



S-3 ROBINSON

Population: near the site - zero

Traffic Count (per day)	Location	1971	1980(est.)
	south of site	14990	22090

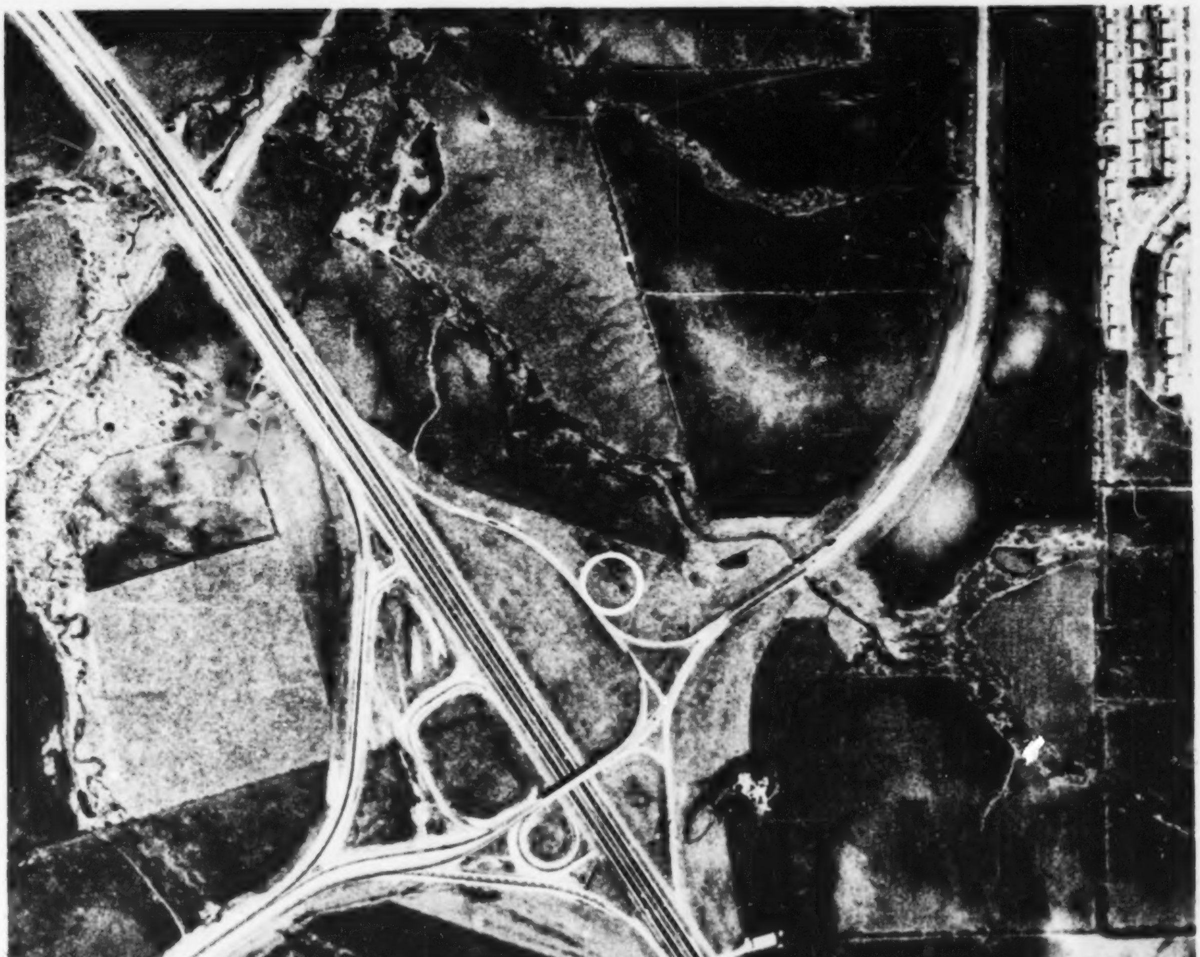
I. Land Use

Land use near the site is open pasture and a very small amount of grazing.

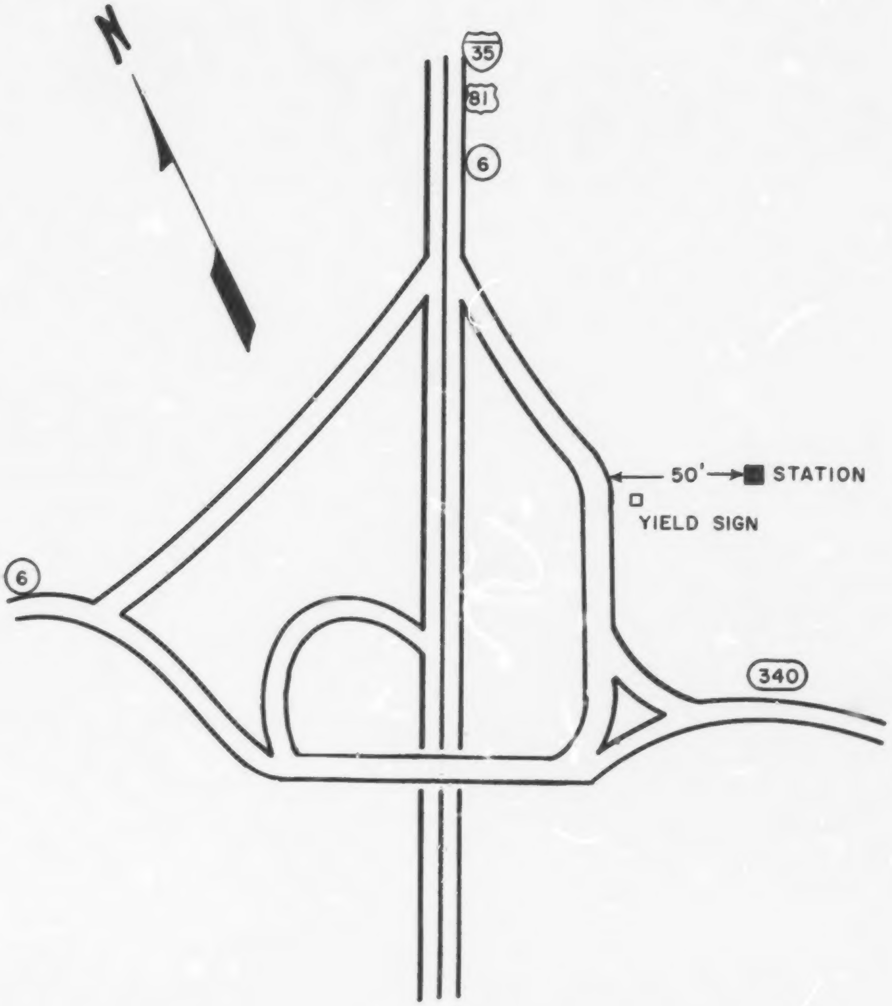
II. Noise Sources

Major: Automobile

Minor: Truck, motorcycle



Aerial photograph of S-3.
Monitoring site is circled.



S-3 ROBINSON

HOURLY "HAND-HELD METER" NOISE DATA AT S-3

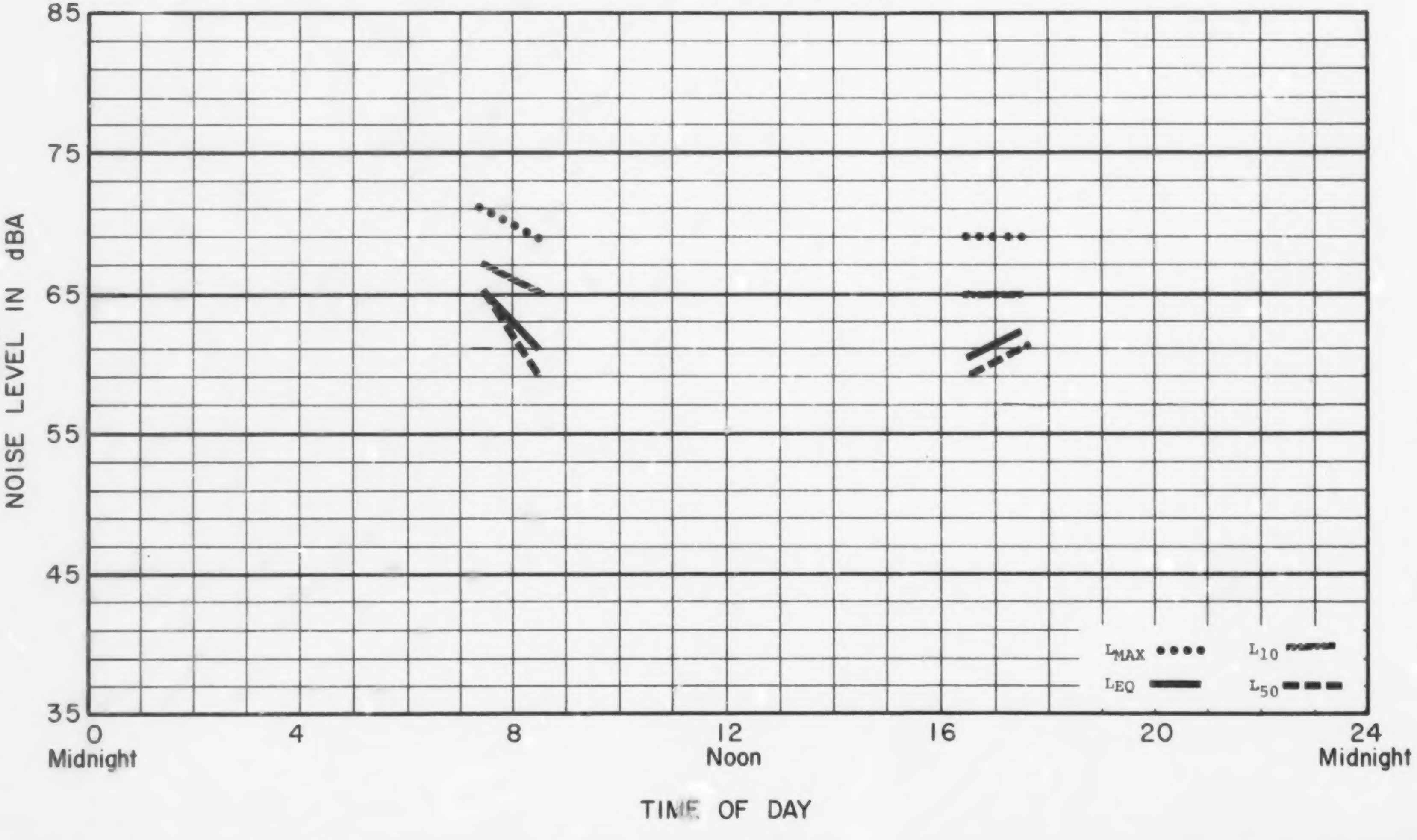
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.00 - 7.50	11	73	67	65	61	71	65.1	71.9	55.0
8.00 - 9.00	9	65	65	59	55	69	60.9	69.1	65.0
16.00-17.00	15	45	65	59	55	69	61.4	70.6	65.0
17.00-18.00	13	56	65	61	57	69	62.2	69.4	59.0

SUMMARY OF NOISE LEVELS AT S-3 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 71 - L_{10} = 65 L_{50} = 61 L_{90} = 57
L_{EQ} = 62.6 L_{DN} = 62.6 L_{NP} = 71.8 TNI = 59.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-3

DECEMBER 1, 1973

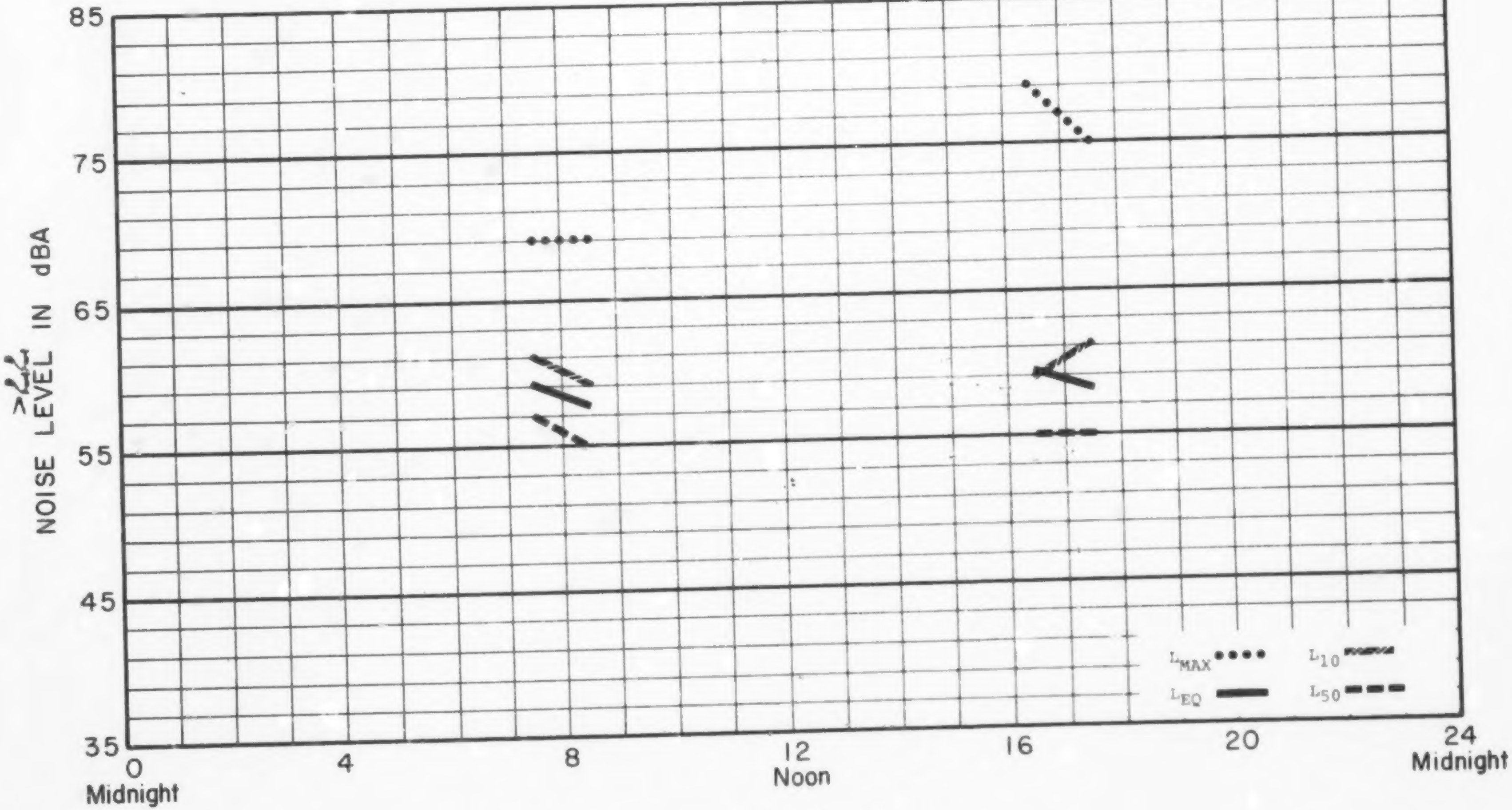
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.10 - 8.00	6	93	61	57	53	69	59.1	67.3	55.0
8.10 - 9.00	3	89	59	55	53	69	57.8	66.2	47.0
16.00-17.00	13	53	59	55	51	79	59.4	68.9	53.0
17.02-18.00	11	59	61	55	51	75	58.4	67.6	61.0

SUMMARY OF NOISE LEVELS AT S-3 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 79 L_{10} = 61 L_{50} = 57 L_{90} = 53

L_{EQ} = 58.7 L_{DN} = 58.7 L_{NP} = 67.9 TNI = 55.0

HOURLY INFORMATION



S-4 PAUL QUINN COLLEGE

Population: 1960 - 7181
(Census Tract #15) 1970 - 5222
1995 - 6554 (est.)

Traffic Counts: (per day)	Locations	1971	1980 (est.)
	(1)	--	9430
	(2)	--	5240
	(3)	28660	61690
	(4)	--	12820

I. Land Use

Census Tract #15 drawing depicts land use showing areas of:

A. Low density residential areas made up of lower middle and lower class dwellings.

B. High density residential areas are made up of lower income, condiminium type apartments.

C. Commercial sections are primarily small stores, shopping center and service stations.

D. Industrial and railroad sections are composed of industrial park-type areas.

E. Public and semi-public sections are churches, schools and the campus of Paul Quinn College.

II. Traffic Count

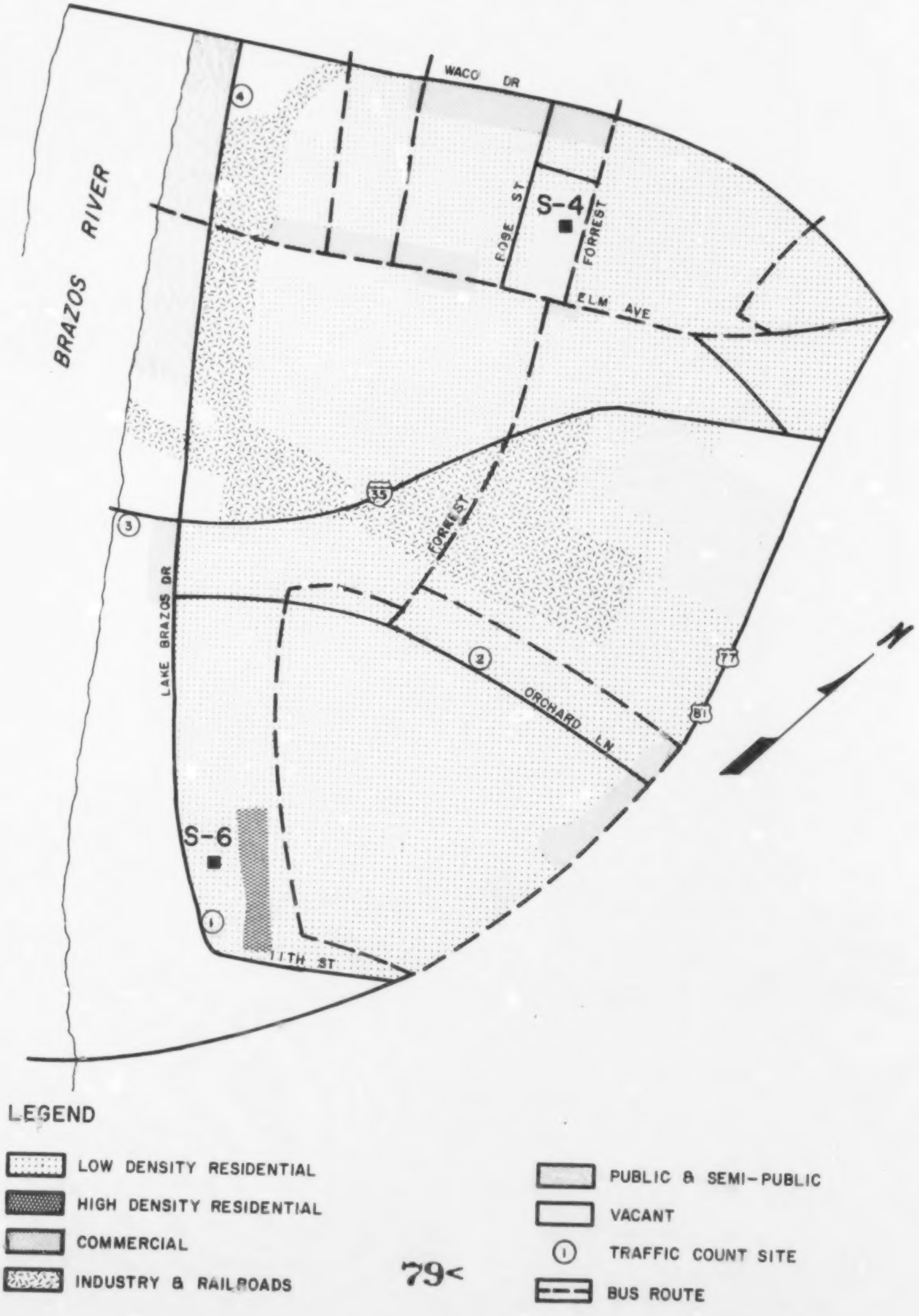
The traffic count sites are located on the drawing and the municipal bus routes through the area are shown.

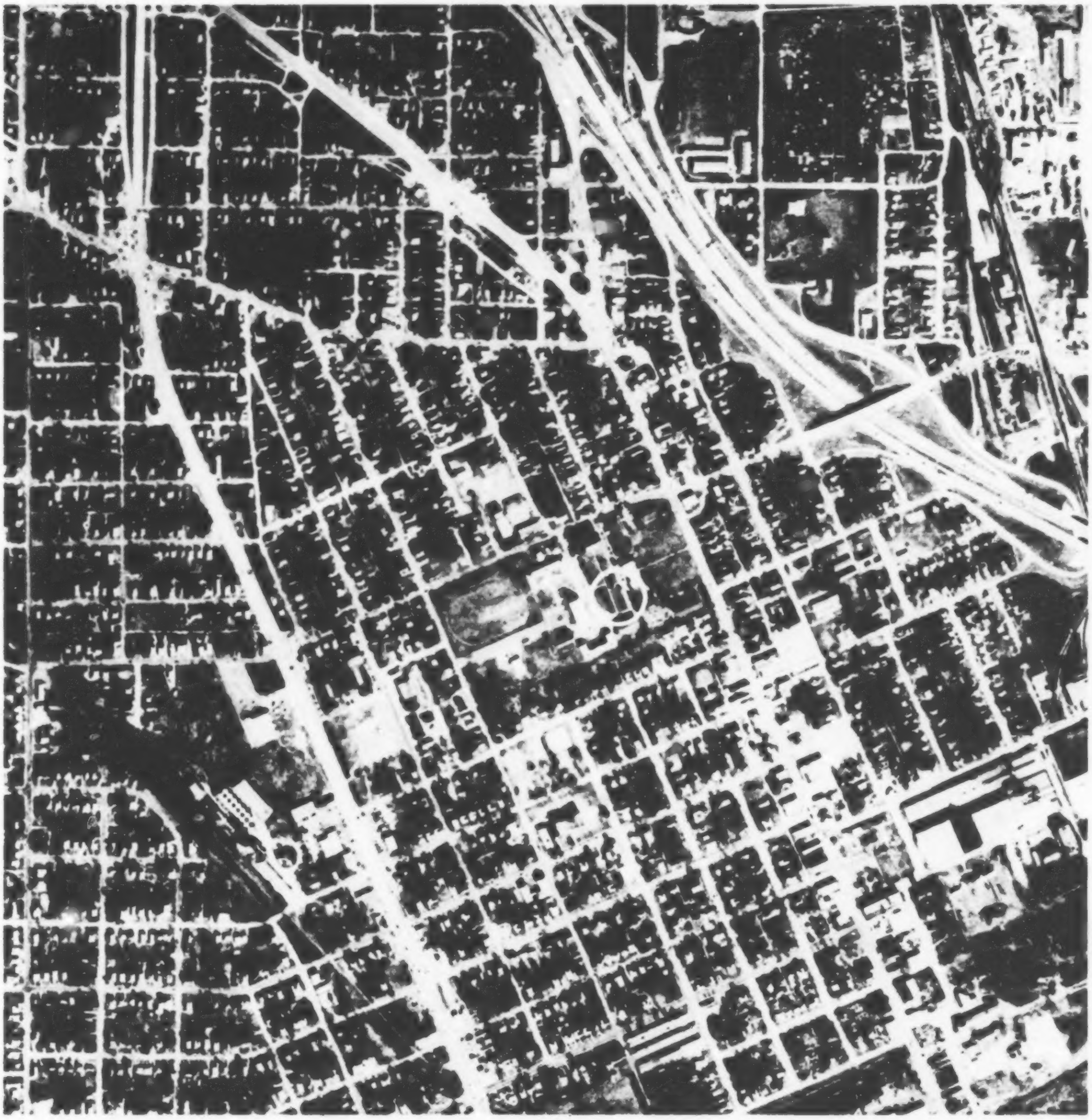
III. Noise Sources

Major: Truck, automobile, residents, railcarriers

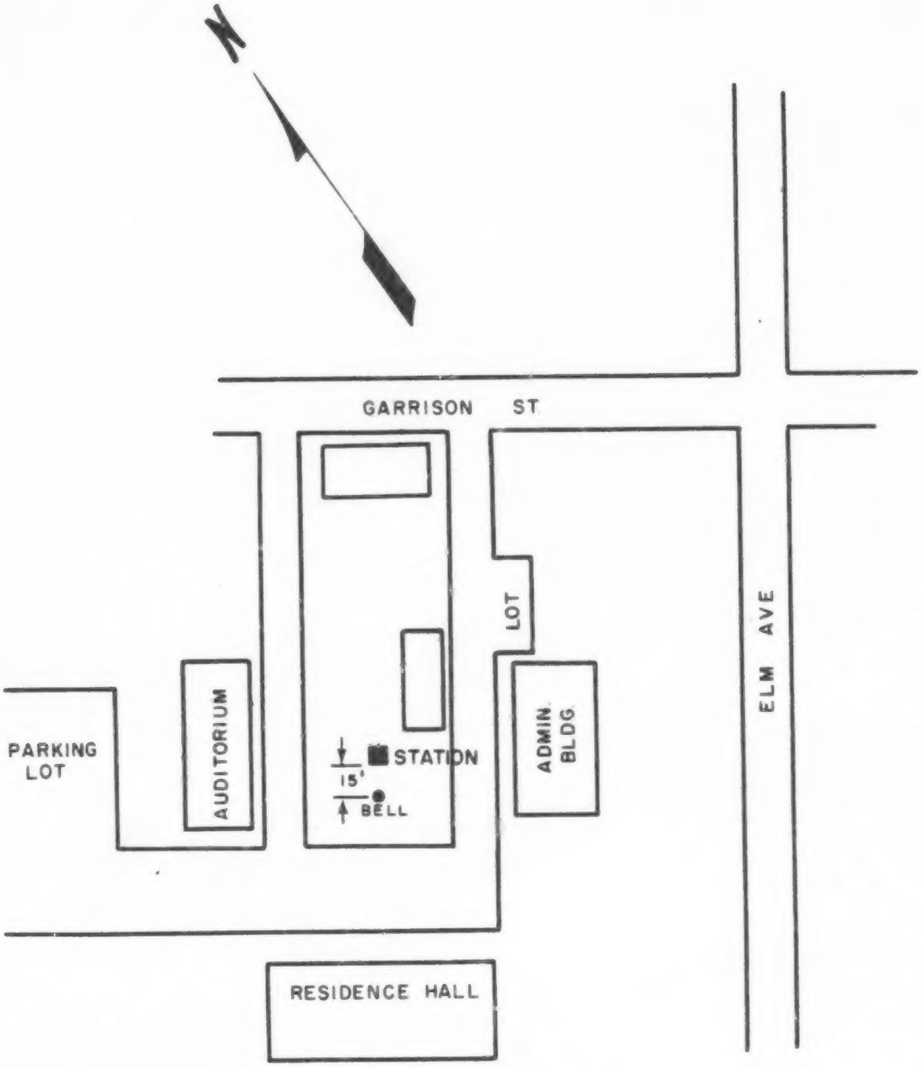
Minor: Dogs, railcarriers, emergency vehicles, birds, insects, motorcycle, light aircraft, Hi-Fi

CENSUS TRACT NO. 15





Aerial photograph of S-4.
Monitoring site is circled.



S-4 PAUL QUINN COLLEGE

HOURLY "HAND-HELD METER" NOISE DATA AT S-4

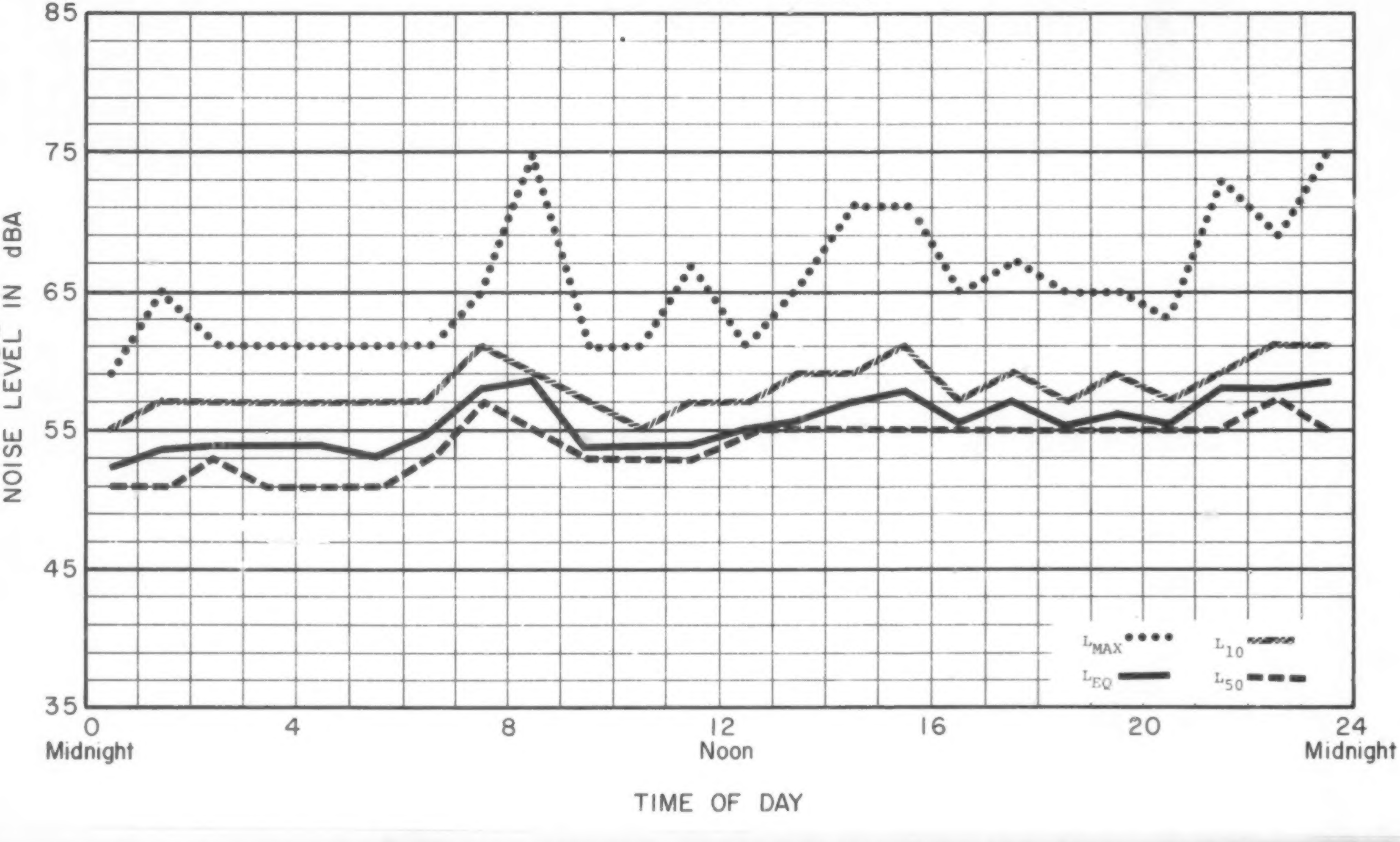
NOVEMBER 30, 1974

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.00 - 1.00	9	52	55	51	47	59	52.4	60.0	49.0
1.00 - 2.00	9	54	57	51	47	65	53.6	62.7	57.0
2.00 - 3.00	9	56	57	53	47	61	54.0	64.4	57.0
3.02 - 4.00	8	60	57	51	45	61	53.8	66.4	63.0
4.08 - 5.00	9	68	57	51	45	61	53.8	66.4	63.0
5.03 - 5.53	9	73	57	51	45	61	53.1	64.6	63.0
6.00 - 7.00	9	68	57	53	51	61	54.8	62.0	45.0
7.00 - 8.00	11	73	61	57	55	65	58.0	64.3	49.0
8.00 - 9.00	9	65	59	55	53	75	58.6	66.4	47.0
9.00 - 9.50	11	56	57	53	51	61	53.7	59.7	45.0
10.05-10.56	15	49	55	53	49	61	53.6	59.9	43.0
11.00-12.00	15	41	57	53	51	67	54.3	61.2	45.0
12.00-13.00	14	32	57	55	51	61	55.1	61.0	45.0
13.00-14.00	14	31	59	55	51	65	55.8	63.0	53.0
14.00-15.00	17	34	59	55	53	71	57.0	64.6	47.0
15.00-16.00	16	38	61	55	53	71	57.6	65.4	55.0
16.00-17.00	15	45	57	55	53	65	55.7	62.1	39.0
17.00-18.00	13	56	59	55	53	67	57.1	63.8	47.0
18.00-19.00	9	64	57	55	51	65	55.3	61.0	45.0
19.00-20.00	8	72	59	55	53	65	56.3	63.0	47.0
20.00-21.00	8	69	57	55	51	63	55.4	61.6	45.0
21.00-22.00	9	67	59	55	51	73	58.2	67.2	53.0
22.00-23.00	8	74	61	57	53	69	58.1	66.2	55.0
23.00-23.50	8	83	61	55	51	75	58.4	67.6	61.0

SUMMARY OF NOISE LEVELS AT S-4 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 59 L_{50} = 55 L_{90} = 49
L_{EQ} = 56.0 L_{DN} = 61.5 L_{NP} = 65.5 TNI = 59.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-4

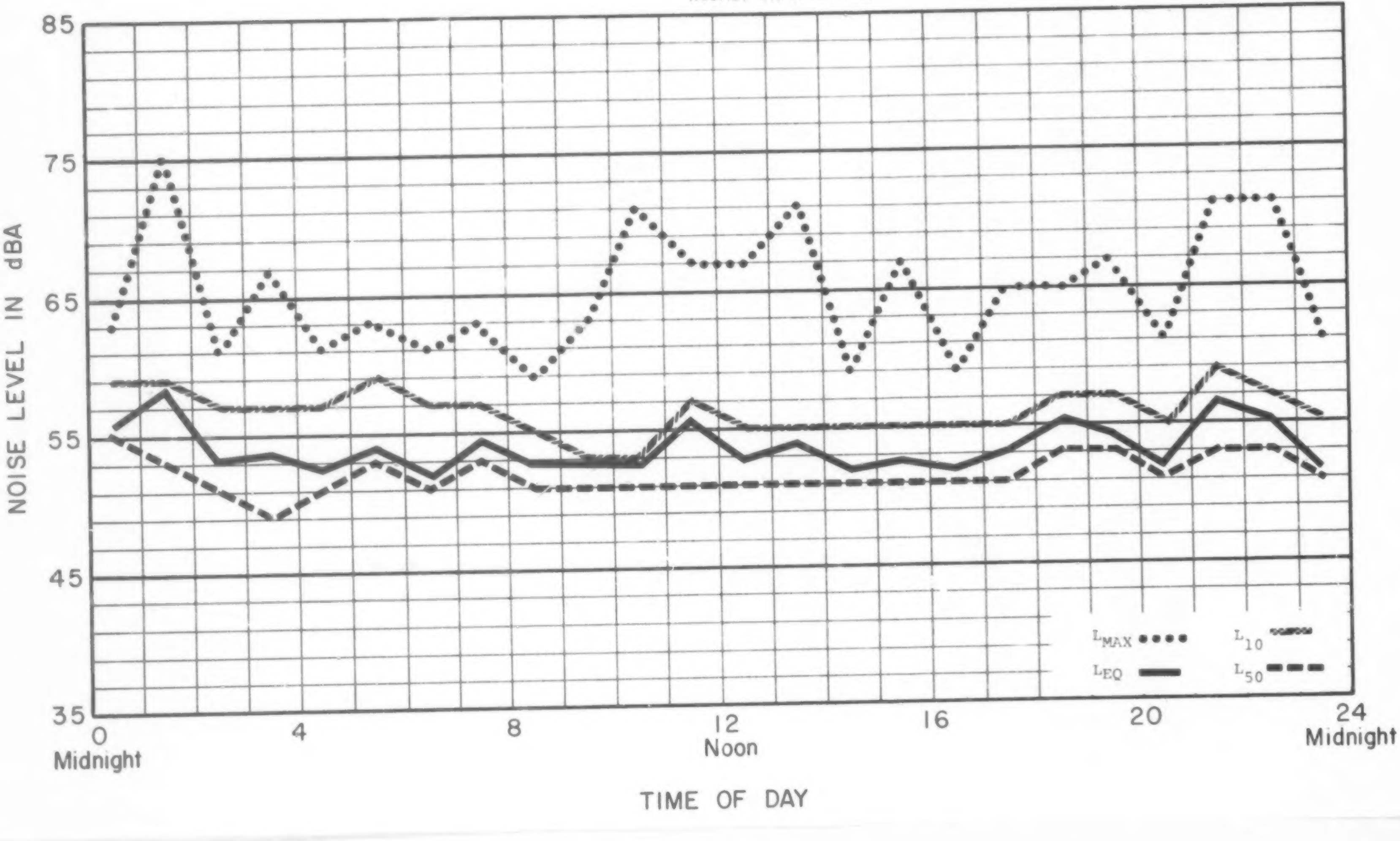
DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.00 - .50	9	77	59	55	51	63	55.9	64.2	53.0
1.00 - 2.00	13	74	59	53	49	75	58.4	69.4	59.0
2.00 - 3.00	13	80	57	51	47	61	53.2	62.1	57.0
3.00 - 4.00	8	83	57	49	45	67	53.4	65.2	63.0
4.00 - 5.00	7	86	57	51	45	61	52.7	64.2	63.0
5.00 - 6.00	7	90	59	53	47	63	54.4	65.8	65.0
6.00 - 7.00	8	93	57	51	47	61	52.2	61.6	57.0
7.00 - 8.00	6	93	57	53	51	63	54.7	61.8	45.0
8.00 - 9.00	3	89	55	51	49	59	52.8	59.6	43.0
9.00 -10.00	6	80	53	51	49	63	52.5	58.9	35.0
10.00-10.50	9	72	53	51	47	71	52.8	59.9	41.0
11.00-12.00	15	59	57	51	49	67	55.7	66.5	51.0
12.00-12.50	14	53	55	51	49	67	52.9	60.6	43.0
13.00-13.50	16	50	55	51	49	71	53.9	61.4	43.0
14.00-15.00	14	50	55	51	49	59	52.3	59.0	43.0
15.00-16.00	15	50	55	51	49	67	52.8	59.7	43.0
16.00-17.00	13	53	55	51	49	59	52.0	57.0	43.0
17.00-18.00	11	59	55	53	51	65	53.2	58.5	37.0
18.00-19.00	7	75	57	53	51	65	55.2	62.0	45.0
19.00-20.00	7	81	57	53	51	67	54.4	60.6	45.0
20.00-21.00	10	75	55	51	49	61	52.1	58.6	43.0
21.00-22.00	10	75	59	53	49	71	56.4	66.1	59.0
22.00-23.00	10	78	57	53	49	71	55.1	63.8	51.0
23.00-24.00	10	75	55	51	47	61	51.7	58.9	49.0

SUMMARY OF NOISE LEVELS AT S-4 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 57 L_{50} = 51 L_{90} = 49
L_{EQ} = 54.1 L_{DN} = 60.7 L_{NP} = 63.1 TNI = 51.0

HOURLY INFORMATION



S-5 TIMBERCREST

Population: Approximately 960 people living in 274 houses

I. Land Use

The land is used primarily for residences, with livestock grazing on the western side.

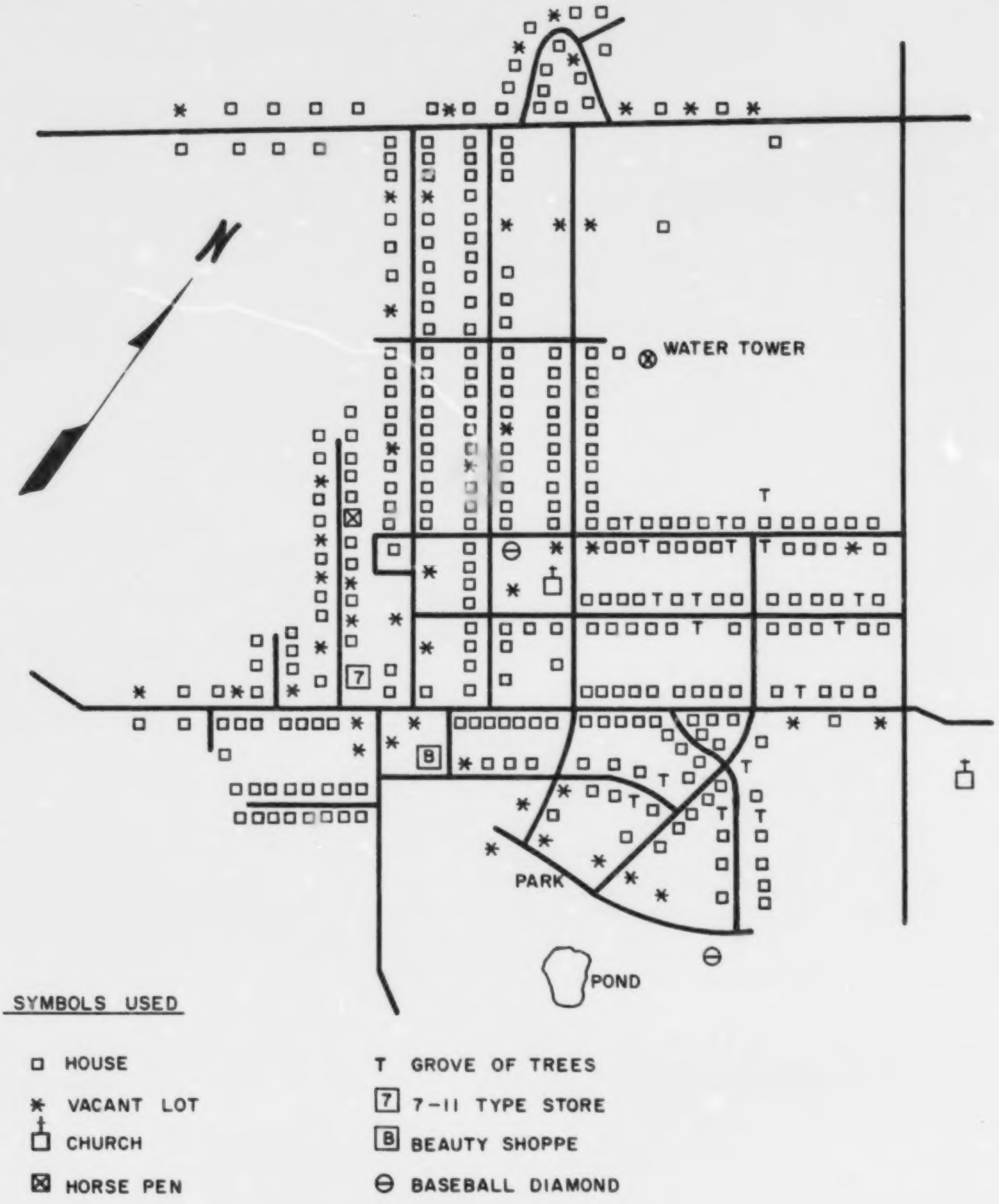
II. Traffic

No city bus lines run through the area. The nearest railroad track to the central control site is two miles away.

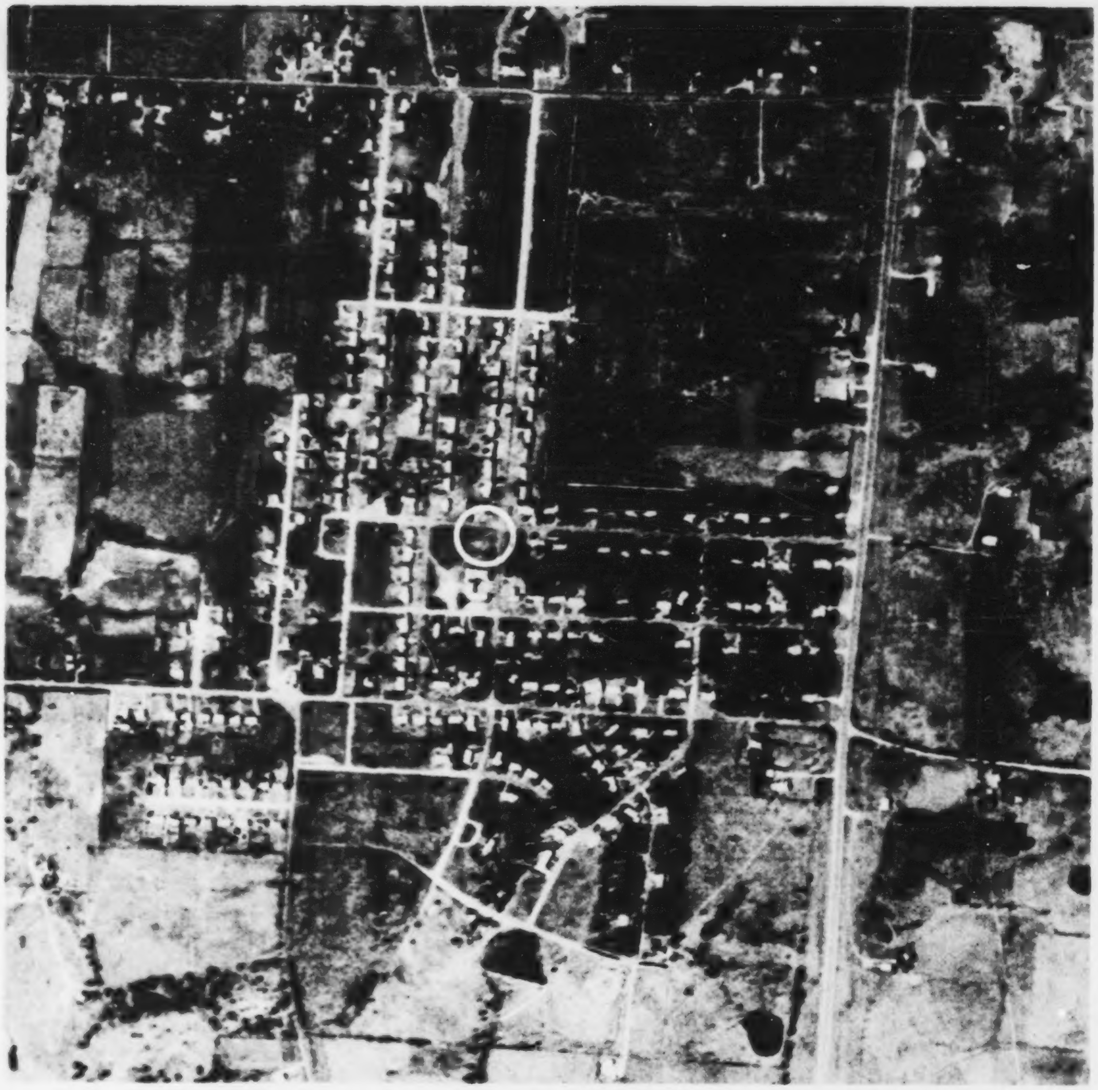
III. Noise Sources

Major: Dogs, railcarrier, automobile, truck, birds, motorcycle, residents

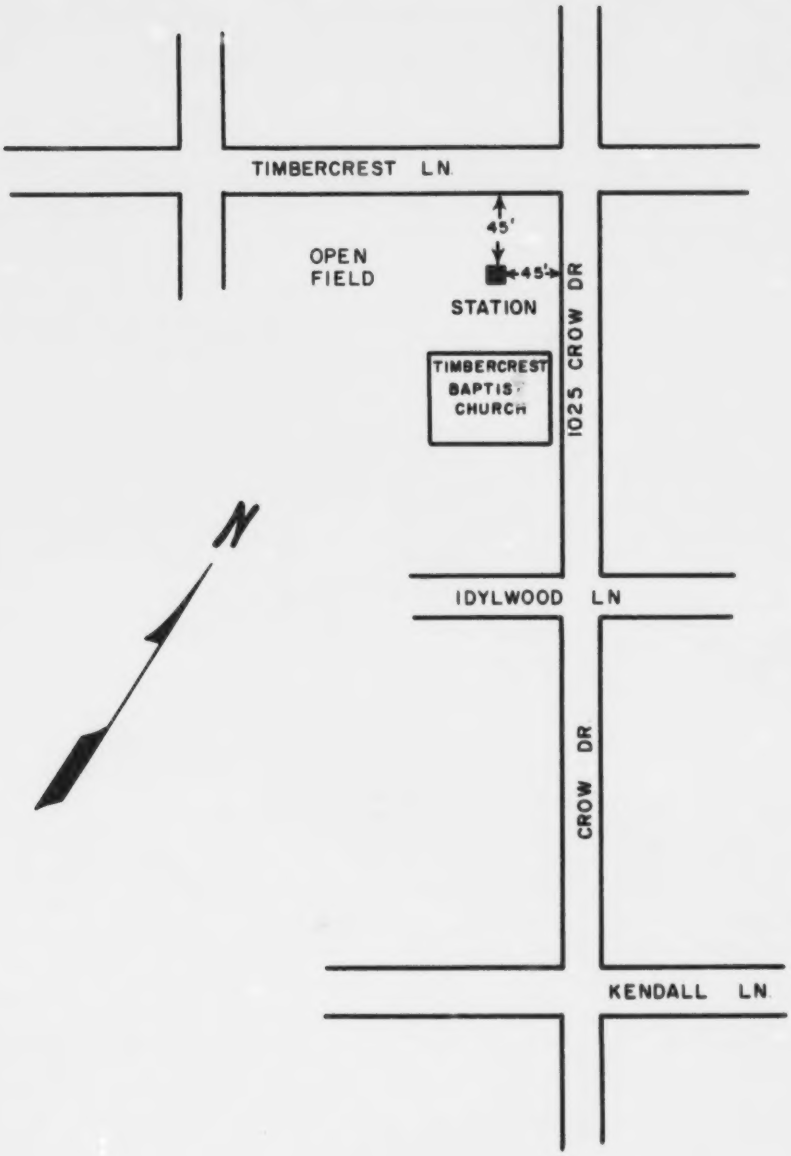
Minor: Automobile, railcarrier, insects, roosters, birds, light aircraft, cows, Hi-Fi



S - 5 TIMBERCREST



Aerial photograph of S-5.
Monitoring site is circled.



S–5 TIMBERCREST

HOURLY "HAND-HELD METER" NOISE DATA AT S-5

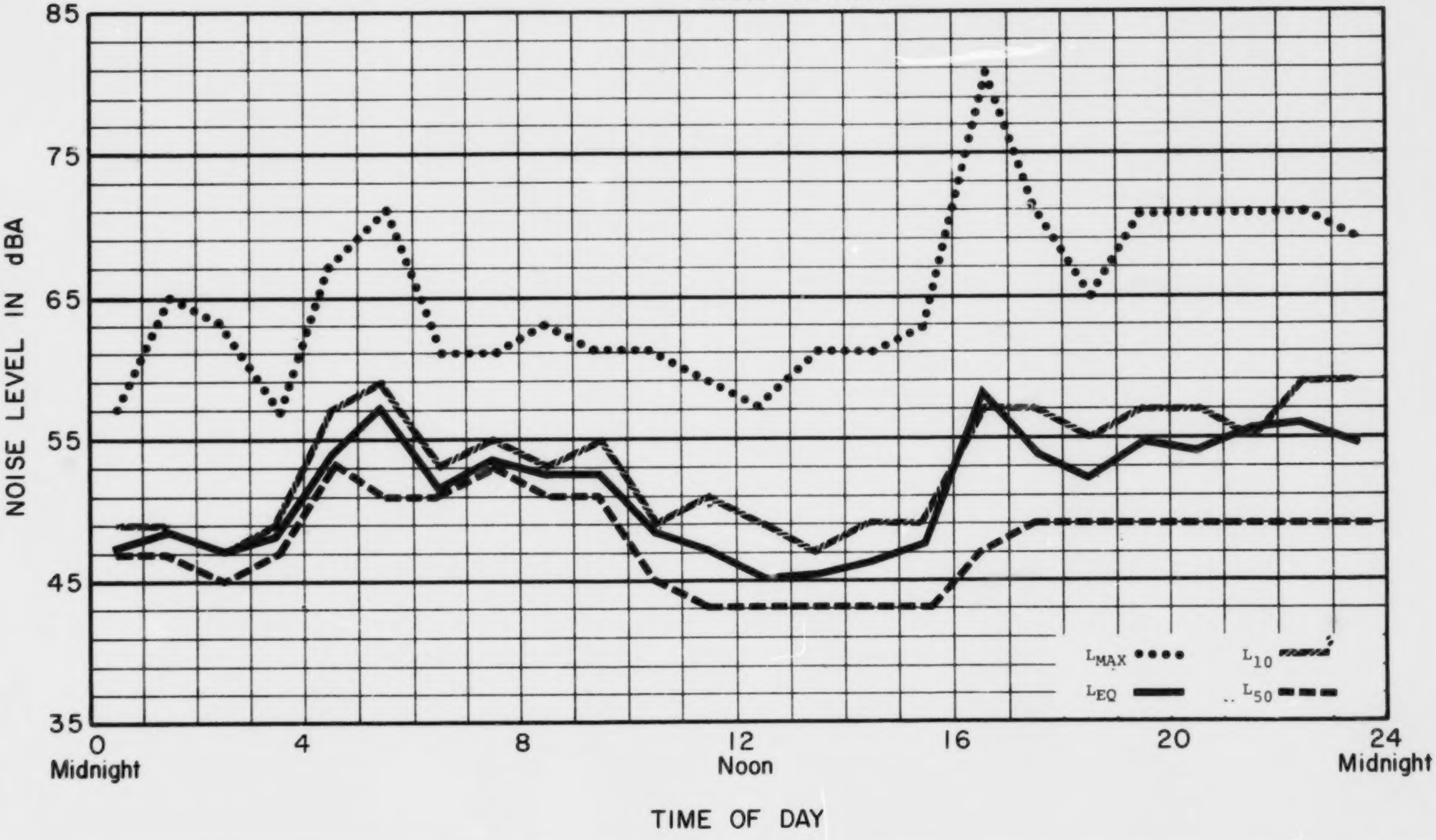
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.00 - 1.00	-1	60	49	47	43	57	47.5	53.9	37.0
1.00 - 2.00	-1	60	49	47	43	65	48.4	55.5	37.0
2.00 - 3.00	-4	62	47	45	45	63	47.3	52.8	23.0
3.00 - 4.00	-2	64	49	47	45	57	48.1	52.6	31.0
4.00 - 5.00	2	68	57	53	49	67	54.0	61.8	51.0
5.00 - 6.00	3	64	59	51	47	71	57.1	69.6	65.0
6.00 - 7.00	1	68	53	51	49	61	51.4	57.5	35.0
7.00 - 7.47	2.5	75	55	53	49	61	53.6	60.2	43.0
8.00 - 9.00	3	65	53	51	51	63	52.7	57.1	29.0
9.00 -10.00	1.5	54	55	51	49	61	52.6	58.1	43.0
10.00-11.00	7	52	49	45	41	61	48.6	58.4	43.0
11.00-12.00	8	44	51	43	39	59	47.2	58.9	57.0
12.00-13.00	8	38	49	43	39	57	45.2	54.3	49.0
13.00-14.00	8	36	47	43	39	61	45.5	54.5	41.0
14.00-15.00	3-6	31	49	43	41	61	46.6	55.6	43.0
15.00-16.00	2-5	38	49	43	39	63	47.6	59.0	49.0
16.00-17.00	4	36	57	47	43	79	58.2	74.6	69.0
17.00-18.00	0-1	42	57	49	45	71	53.8	65.8	63.0
18.00-19.00	NIL	50	55	49	47	65	52.3	61.8	49.0
19.00-20.00	NIL	74	57	49	45	71	54.9	68.2	63.0
20.00-21.00	1	65	57	49	45	71	54.2	65.7	63.0
21.00-22.00	1	68	55	49	45	71	55.5	67.8	55.0
22.00-23.00	2.5	74	59	49	45	71	56.1	70.8	71.0
23.00-24.00	2	76	59	49	47	69	54.7	67.2	65.0

SUMMARY OF NOISE LEVELS AT S-5 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 79 L_{10} = 55 L_{50} = 49 L_{90} = 43
L_{EQ} = 53.0 L_{DN} = 59.3 L_{NP} = 65.9   TNI = 61.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-5

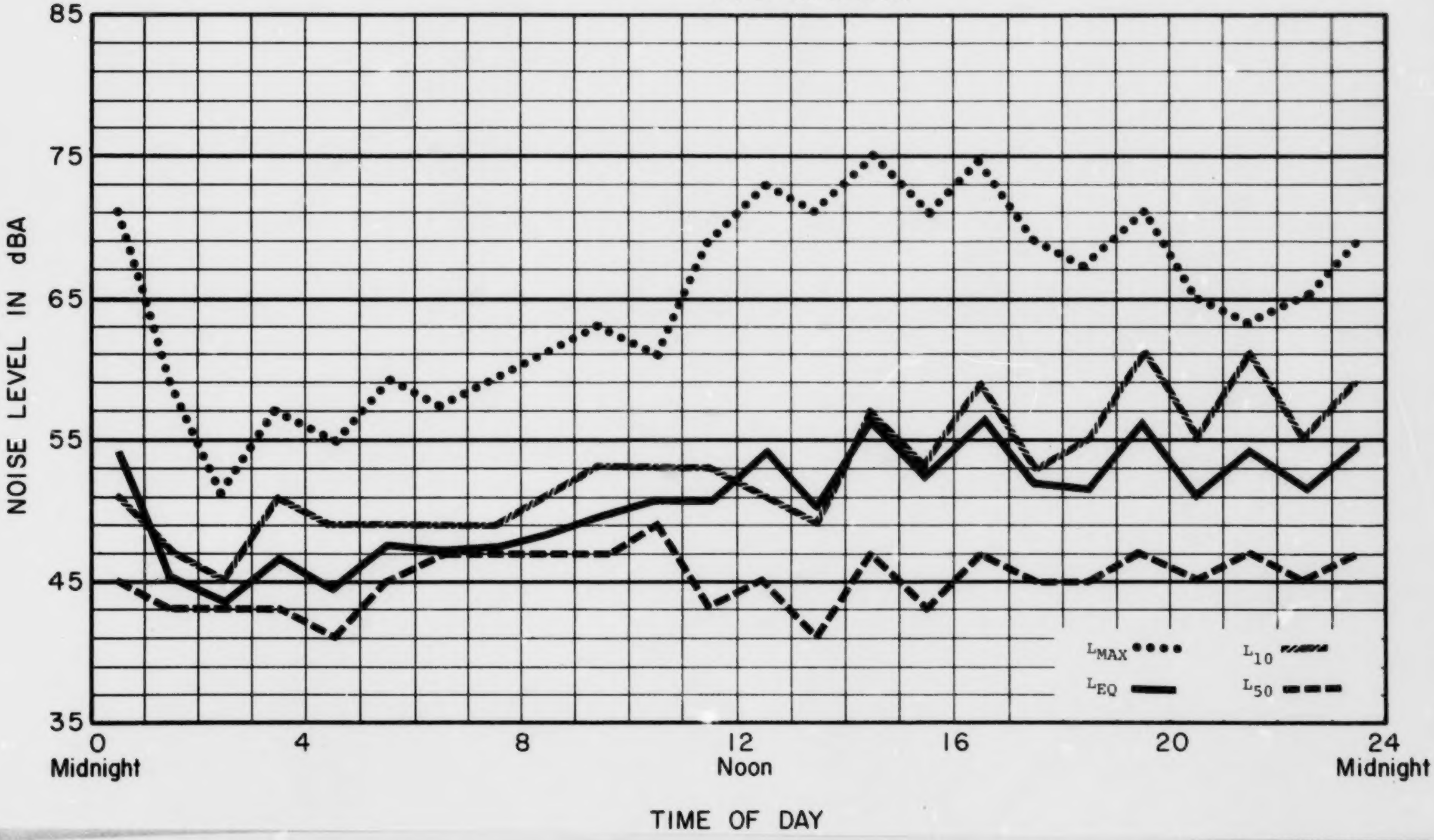
DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.07-1.00	2	50	51	45	43	71	54.1	66.6	45.0
1.00-1.50	0-1	86	47	43	39	59	45.2	53.9	41.0
2.01-3.00	2	86	45	43	41	51	43.5	49.2	27.0
3.00-4.00	2	89	51	43	41	57	46.7	56.9	51.0
4.00-5.00	0-1	86	49	41	39	55	44.7	53.7	49.0
5.00-6.00	0-1	90	49	45	43	59	47.6	55.2	37.0
6.00-7.00	0-1	93	49	47	45	57	47.3	52.9	31.0
7.00-8.00	0-1	93	49	47	45	59	47.6	53.0	31.0
8.00-9.00	3	89	51	47	45	61	48.4	55.9	39.0
9.00-10.00	4	100	53	47	45	63	49.7	58.3	47.0
10.00-11.00	1	80	53	49	45	61	50.9	59.7	47.0
11.00-12.00	5	64	53	43	39	69	50.8	64.5	65.0
12.00-13.00	7	52	51	45	39	73	54.1	69.2	57.0
13.00-14.00	6	52	49	41	37	71	50.4	64.0	55.0
14.00-15.00	4-12	51	57	47	37	75	56.7	75.4	87.0
15.00-16.00	6-9	48	53	43	39	71	52.3	68.3	65.0
16.00-17.00	5	52	59	47	43	75	56.4	72.3	77.0
17.00-18.00	6	61	53	45	41	69	52.0	66.2	59.0
18.00-19.00	NIL	65	55	45	43	67	51.6	64.4	61.0
19.00-20.00	NIL	73	61	47	43	71	56.3	73.6	85.0
20.00-21.00	1	72	55	45	41	65	50.9	63.5	67.0
21.00-22.00	1	88	61	47	41	63	54.4	70.8	91.0
22.00-23.00	0-1	79	55	45	41	65	51.7	65.8	67.0
23.00-24.00	0-1	82	59	47	41	69	54.7	71.4	83.0

SUMMARY OF NOISE LEVELS AT S-5 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 53 L_{50} = 45 L_{90} = 41
L_{EQ} = 52.2 L_{DN} = 56.6 L_{NP} = 65.8 TNI = 59.0

HOURLY INFORMATION



S-6 HIGHWAY 77-81 AT PEACH STREET

Population: (Census Tract #15)	1960 - 7181 1970 - 5222 1995 - 6554 (est.)

Traffic Counts: (per day)	Location	1971	1980 (est.)
	(1)	--	9430
	(2)	--	5240
	(3)	28660	61690
	(4)	--	12820

I. Land Use

Census Tract #15 drawing depicts land use showing areas of:

A. Low density residential areas made up of lower middle and lower class dwellings.

B. High density residential areas are made up of lower income, condiminium-type apartments.

C. Commercial sections are primarily small stores, shopping centers and service stations.

D. Industrial and railroad sections are composed of industrial park-type areas.

E. Public and semi-public sections are churches, schools and the campus of Paul Quinn College.

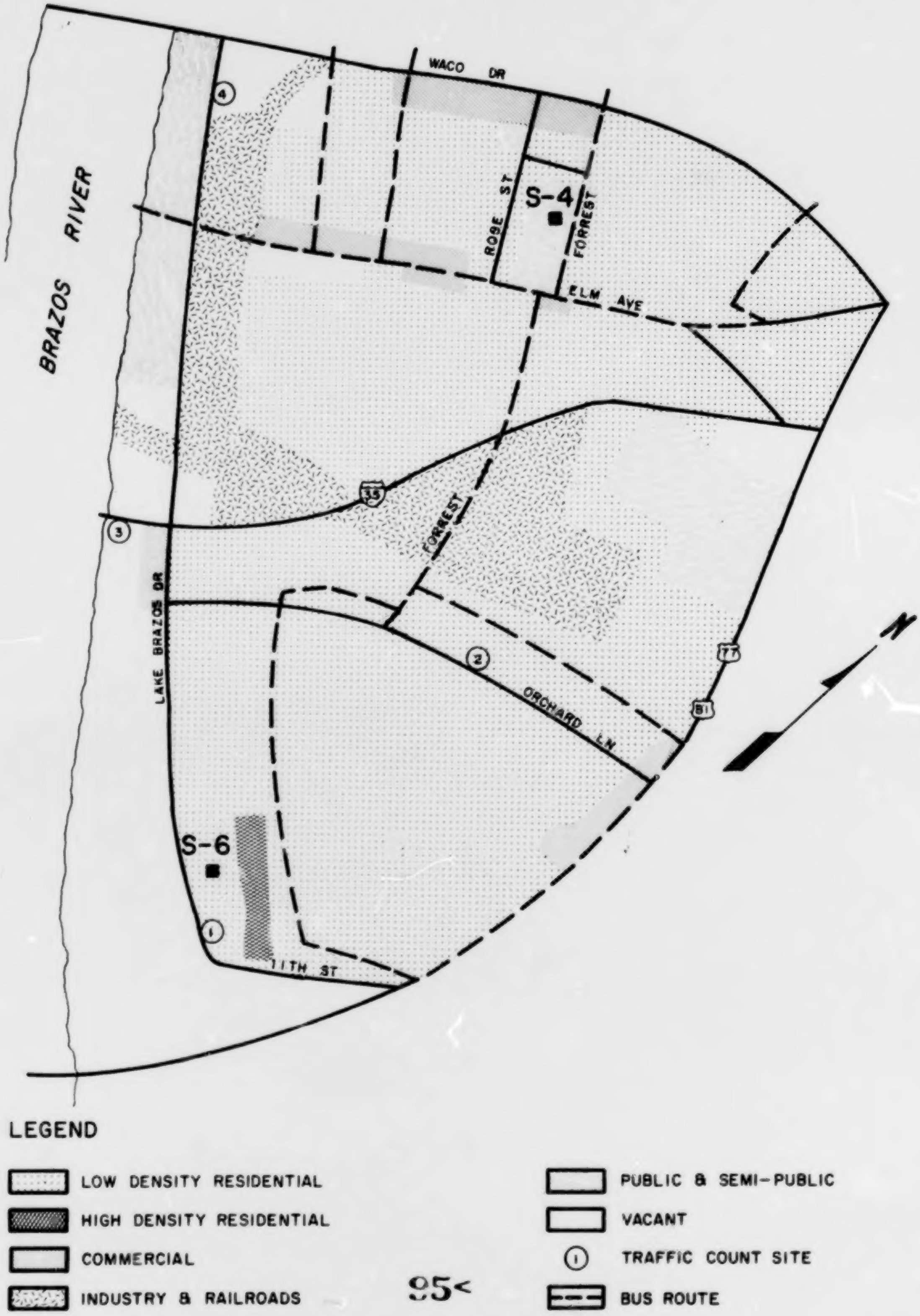
II. Traffic Count

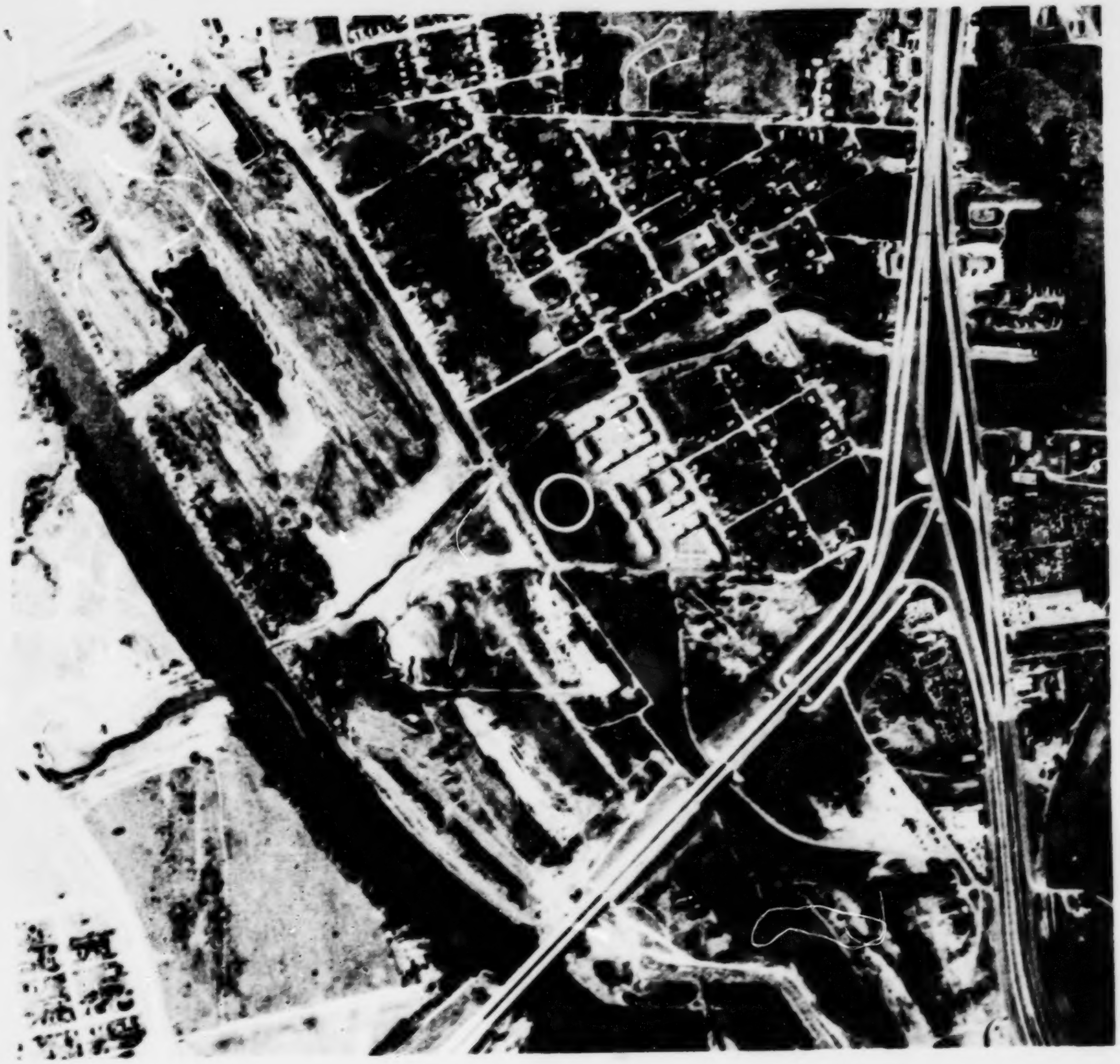
The traffic count sites are located on the drawing and the municipal bus routes through the area are shown.

III. Noise Sources

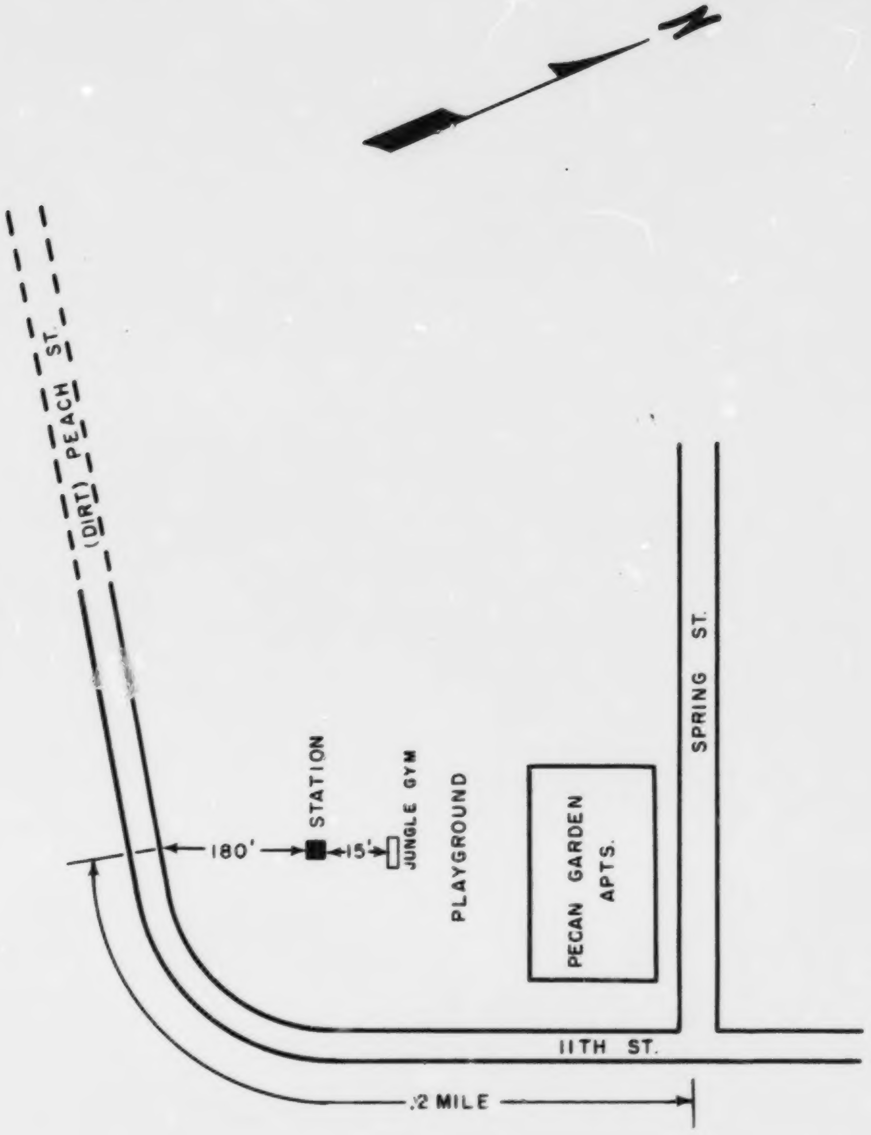
Major: Truck, residents, automobile
Minor: Birds, light aircraft, railcarrier, motorcycle

CENSUS TRACT NO. 15





Aerial photograph of S-6.
Monitoring site is circled.



S-6 HIGHWAY 77-81 AT PEACH STREET

HOURLY "HAND-HELD METER" NOISE DATA AT S-6

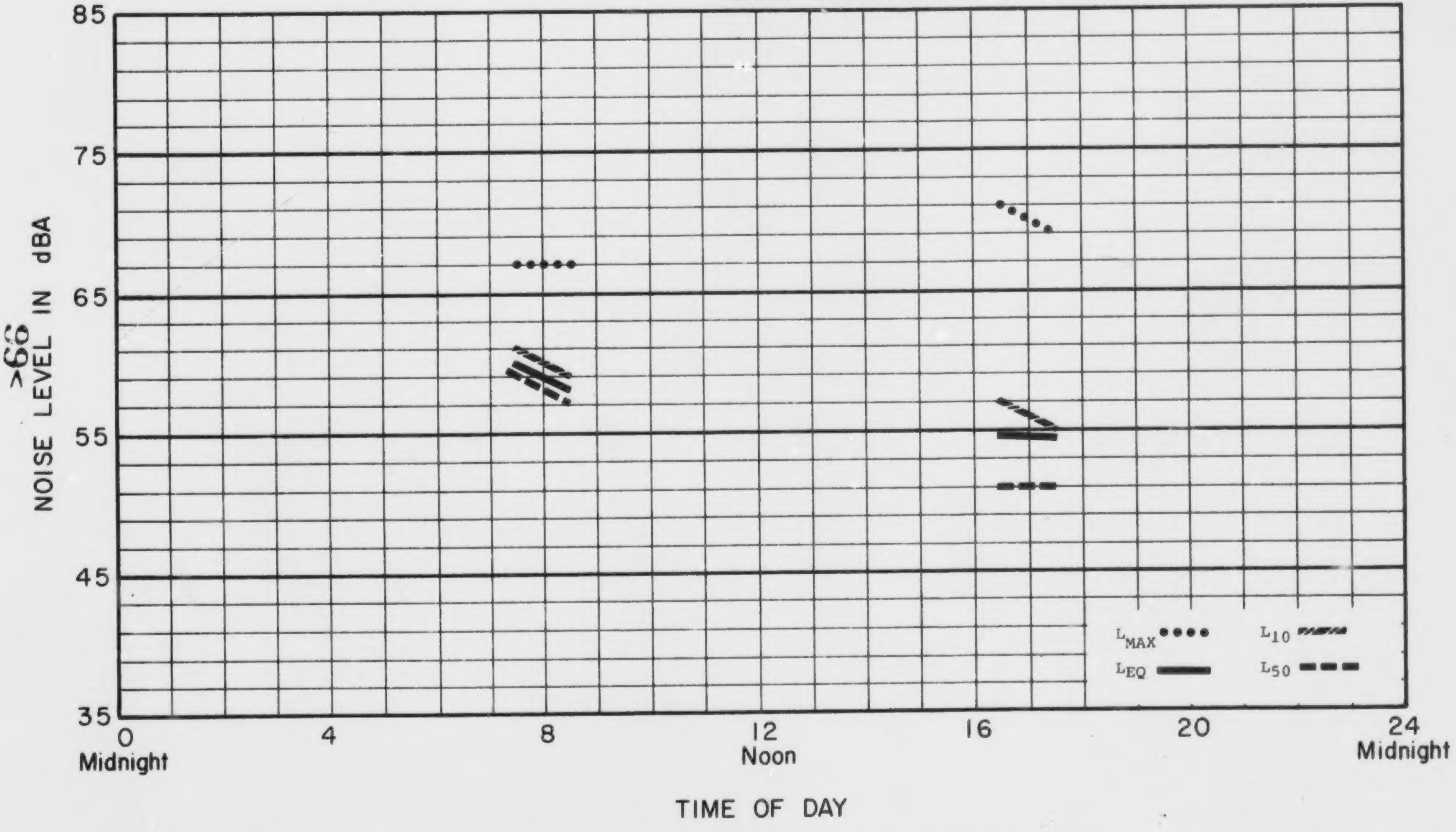
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.00 - 7.50	11	73	61	59	57	67	59.7	65.8	43.0
8.00 - 8.50	9	65	59	57	55	67	57.9	63.8	41.0
16.00-17.00	15	45	57	51	49	71	54.8	63.8	51.0
17.00-18.00	13	56	55	51	51	69	54.2	61.2	37.0

SUMMARY OF NOISE LEVELS AT S-6 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 71 L_{10} = 61 L_{50} = 55 L_{90} = 51
L_{EQ} = 57.2 L_{DN} = 57.2 L_{NP} = 67.6 TNI = 61.0

HOURLY INFORMATION



>66

HOURLY "HAND-HELD METER" NOISE DATA AT S-6

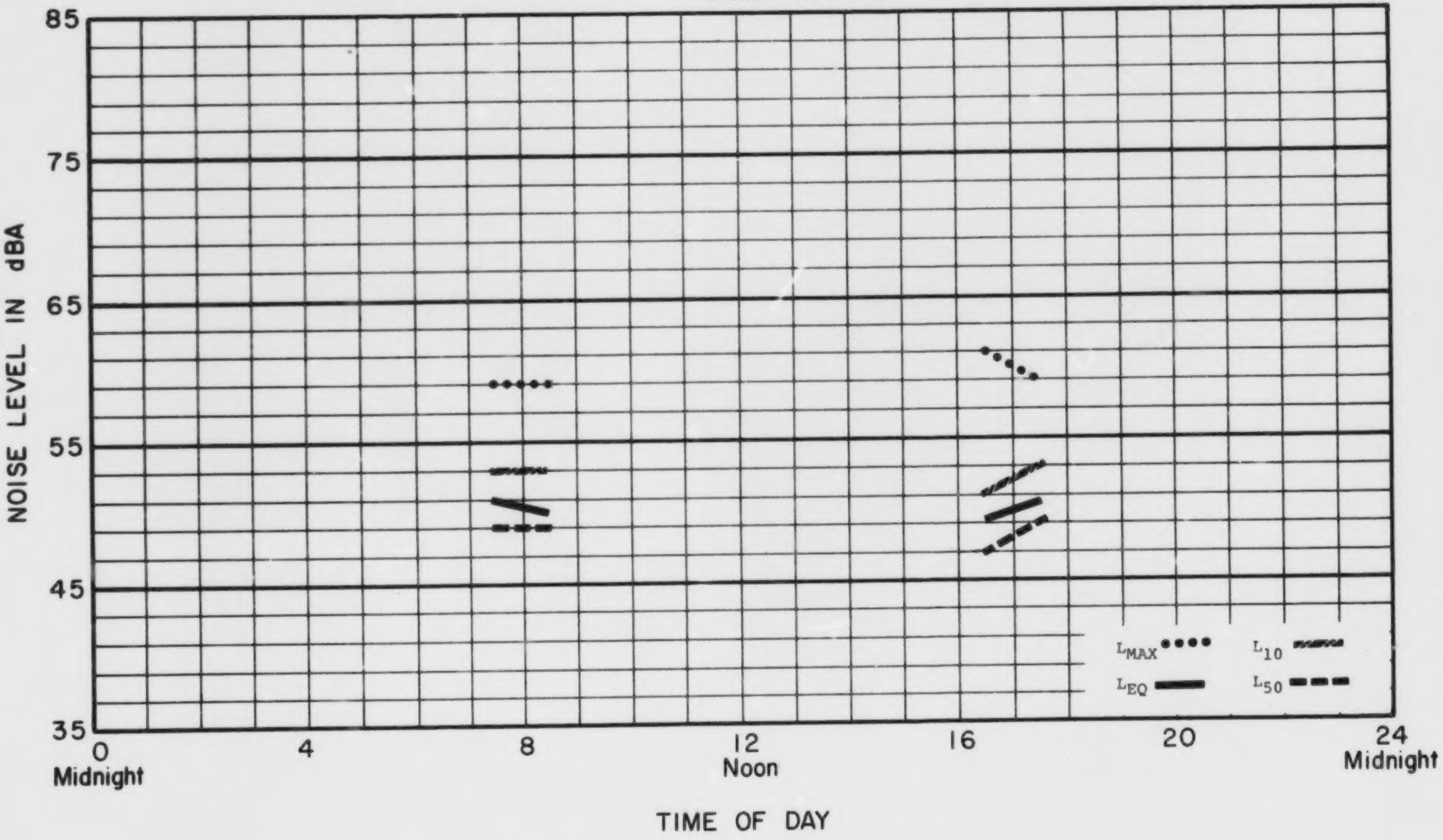
DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.00 - 8.00	6	93	53	49	47	59	51.0	57.4	41.0
8.00 - 9.00	3	89	53	49	47	59	50.5	55.7	41.0
16.00-17.00	13	53	51	47	45	61	49.2	56.0	39.0
17.00-18.00	11	59	53	49	47	59	50.6	57.3	41.0

SUMMARY OF NOISE LEVELS AT S-6 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 61 L_{10} = 53 L_{50} = 49 L_{90} = 47
L_{EQ} = 50.4 L_{DN} = 50.4 L_{NP} = 57.0 TNI = 41.0

HOURLY INFORMATION



S-7 MIDWAY HIGH SCHOOL

Population: (Census Tract #25.2)	1960 - 3290 1970 - 4845 1995 - 9527 (est.)

Traffic Counts:	Locations	1971	1980 (est.)
	(1)	12480	17810
	(2)	8030	10460
	(3)	--	5260

I. Land Use

Census Tract #25.2 drawing depicts the land use showing the areas of:

A. Low density residential which is mostly middle and upper middle class dwellings with a few upper class houses.

B. High density residential is mostly comprised of 1 and 2-story apartments.

C. Commercial sections are occupied by shopping centers and service stations.

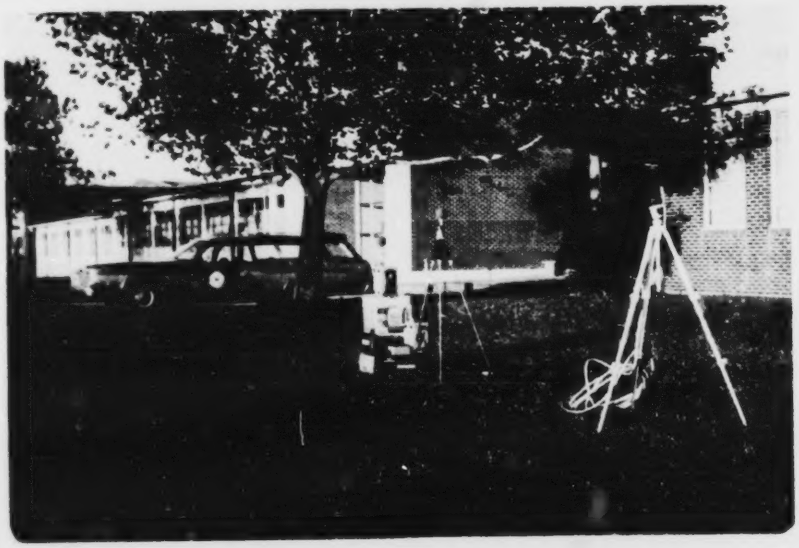
D. Public and semi-public areas are schools and few churches.

II. Traffic

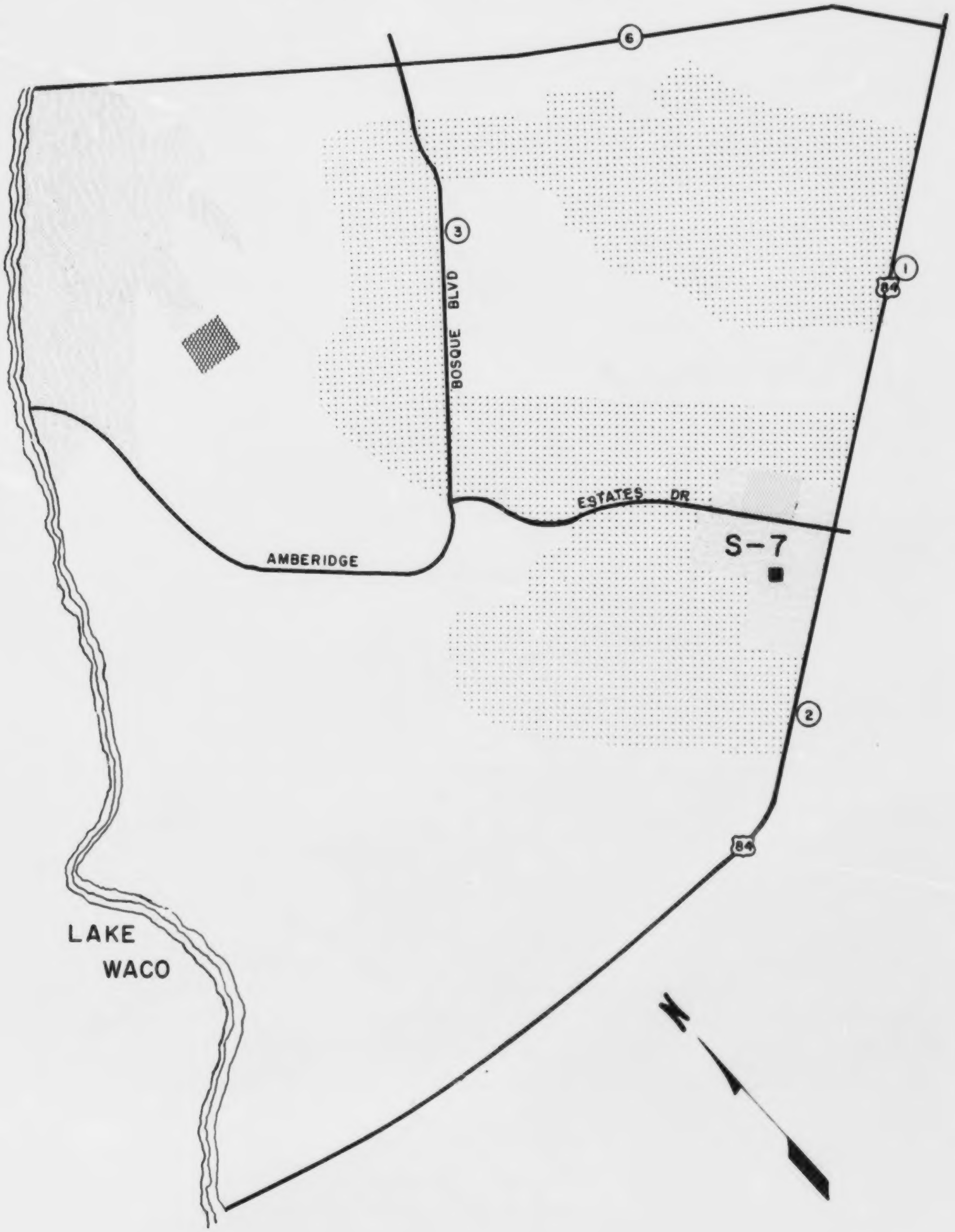
Traffic count sites are located on the drawing. There are no bus routes within this census tract.

III. Noise Sources

Major: Automobile, truck, motorcycle
Minor: Light aircraft

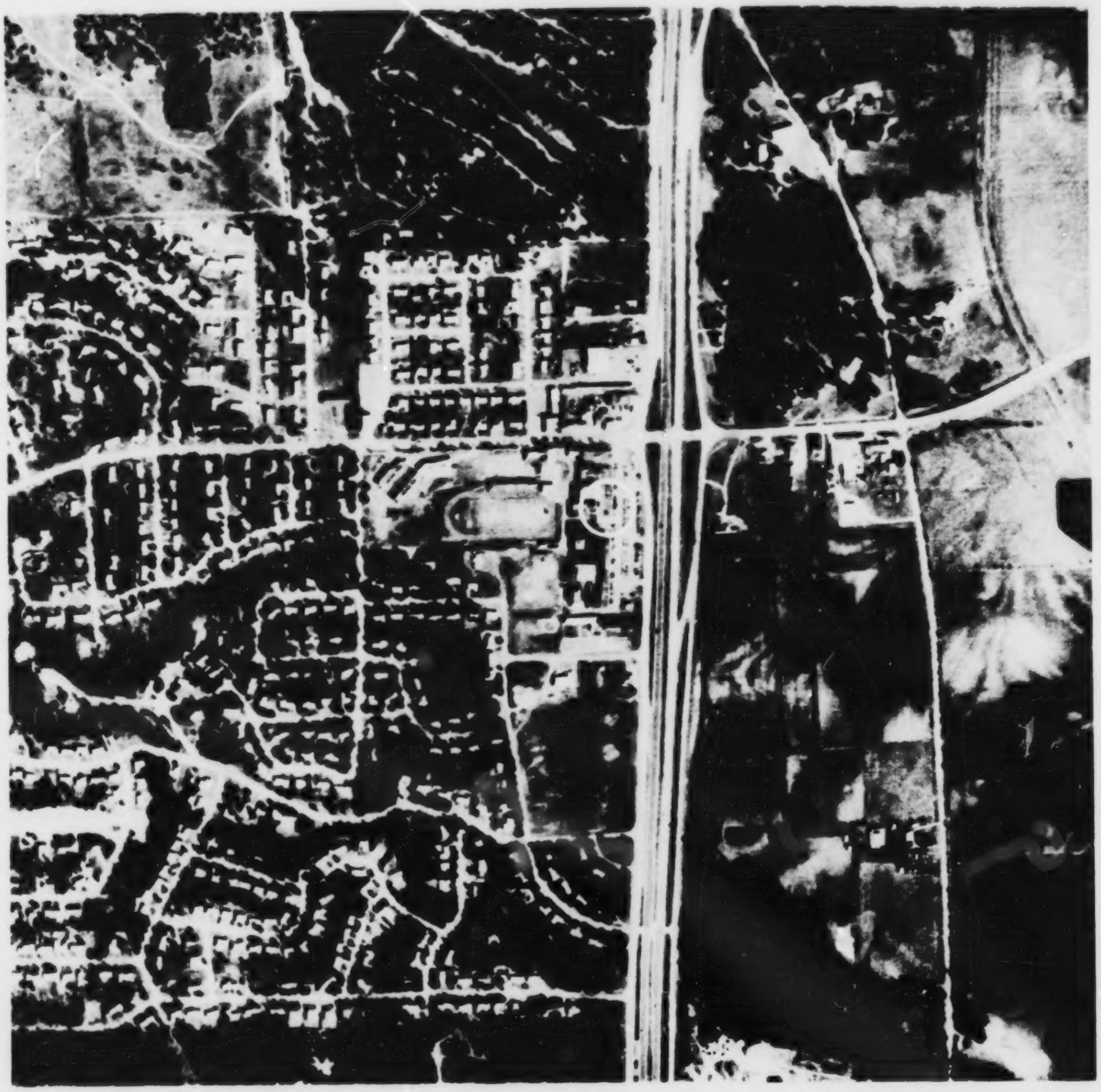


CENSUS TRACT NO. 25.2

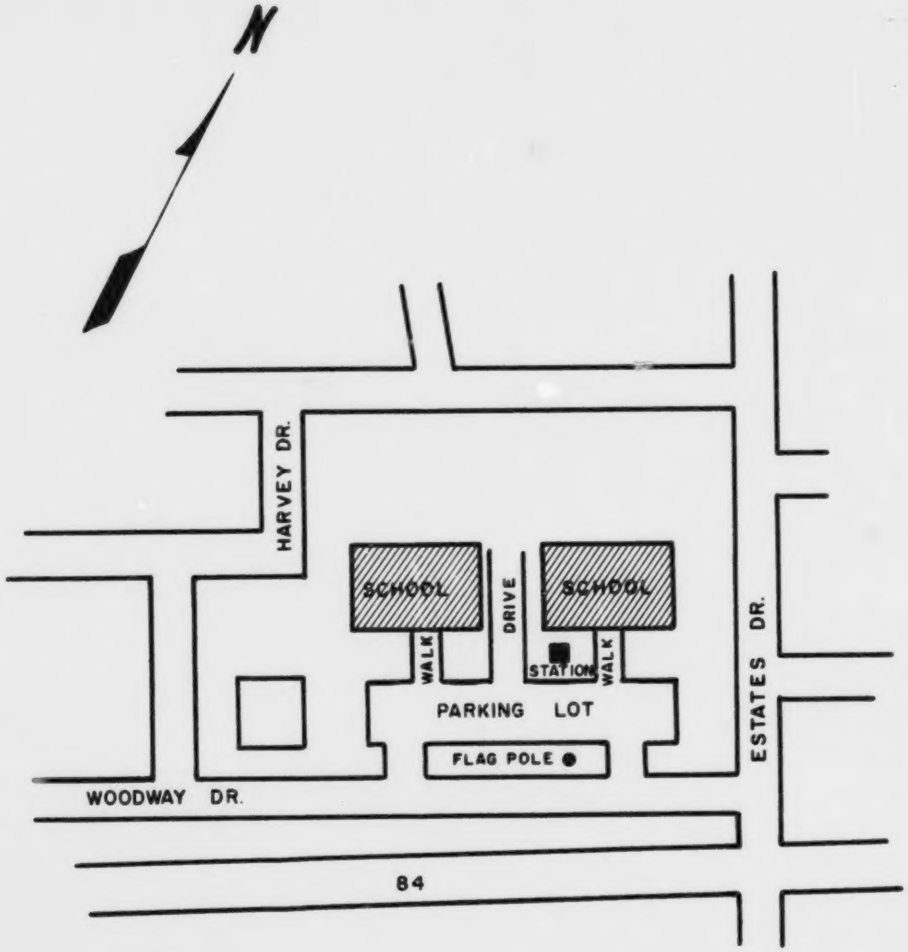


LEGEND

- ░ LOW DENSITY RESIDENTIAL
- ▩ HIGH DENSITY RESIDENTIAL
- ▨ COMMERCIAL
- ☐ PUBLIC & SEMI-PUBLIC
- ☐ VACANT
- ① TRAFFIC COUNT SITE



Aerial photograph of S-7.
Monitoring site is circled.



S-7 MIDWAY HIGH SCHOOL

HOURLY "HAND-HELD METER" NOISE DATA AT S-7

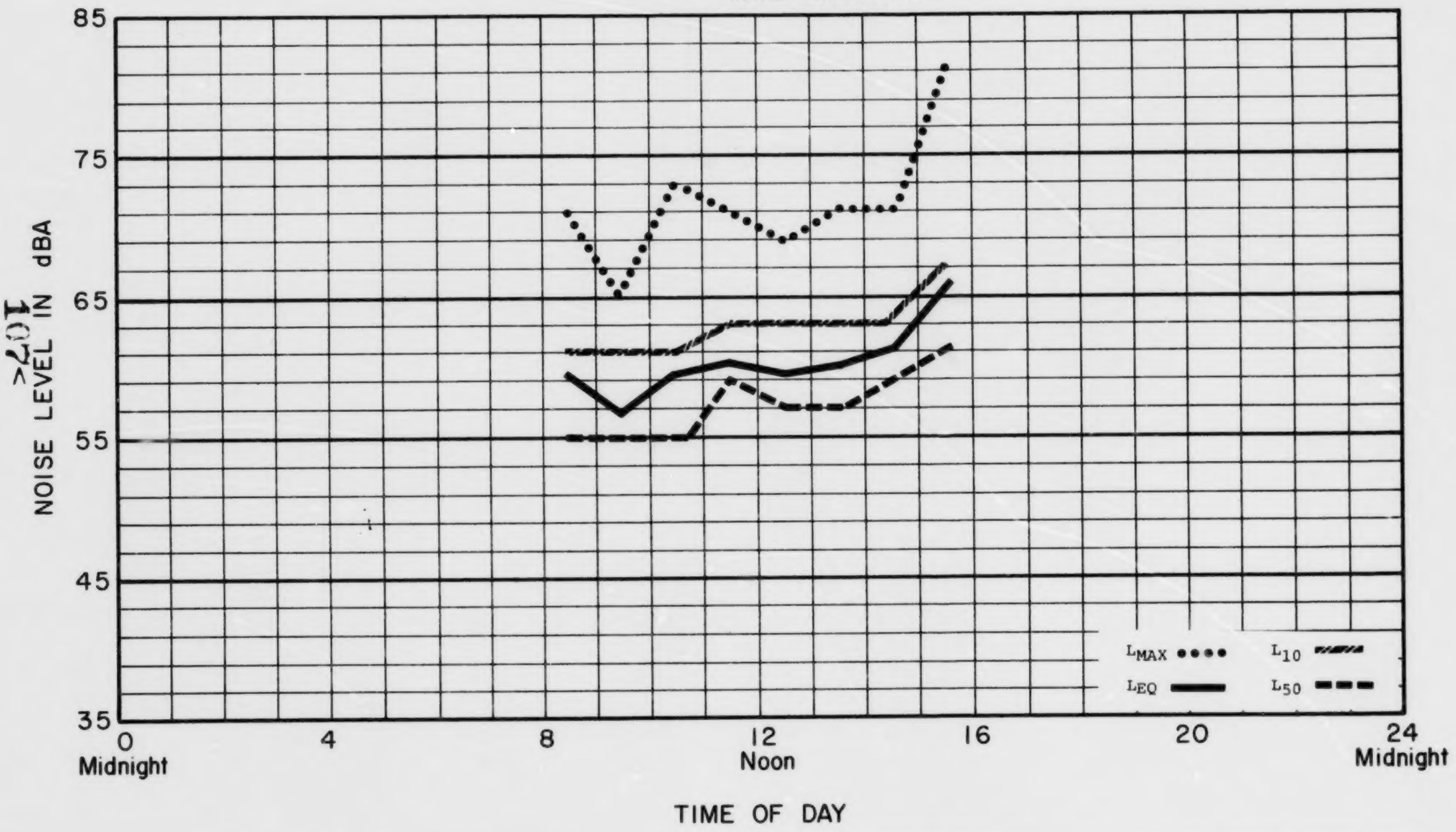
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
9.17 - 10.17	11	56	61	55	51	65	56.5	65.4	61.0
10.17- 11.17	15	49	61	55	51	73	59.5	70.2	61.1
11.17- 12.17	15	41	63	59	55	71	60.4	69.7	57.0
12.17- 13.17	14	32	63	57	53	69	59.6	69.6	63.0
13.17- 14.17	14	31	63	57	53	71	60.0	69.7	63.0
14.17- 15.17	17	34	63	59	55	71	61.0	70.3	57.0
15.17- 16.17	16	38	67	61	57	81	65.5	76.7	67.0

SUMMARY OF NOISE LEVELS AT S-7 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 81 L_{10} = 63 L_{50} = 57 L_{90} = 53
L_{EQ} = 61.0 L_{DN} = 61.0 L_{NP} = 72.0 TNI = 63.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT S-7

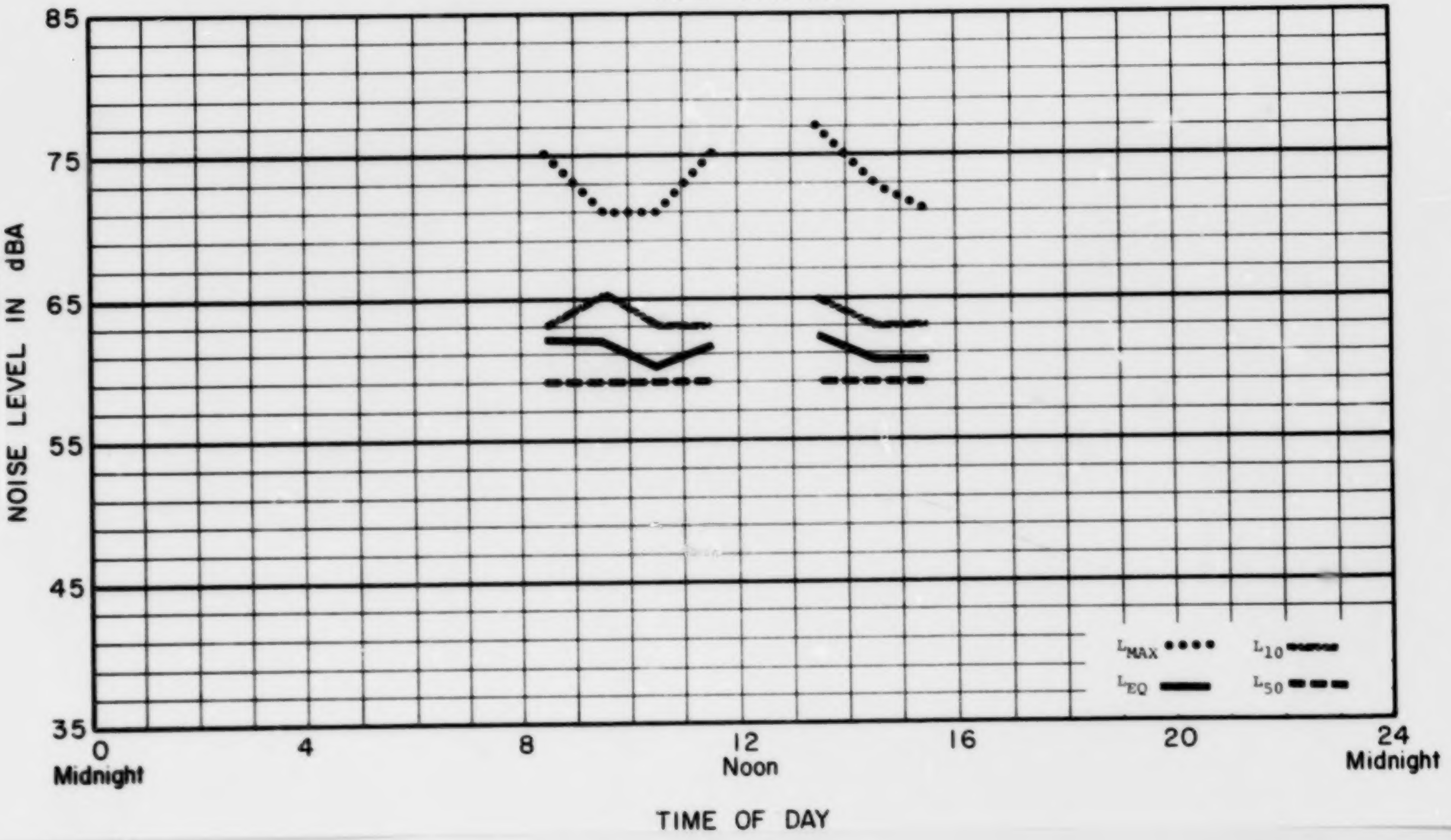
DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 9.00	3	89	63	59	53	75	62.0	73.0	63.0
9.00 -10.00	6	80	65	59	55	71	61.7	72.3	65.0
10.00-11.00	9	72	63	59	55	71	60.2	69.7	57.0
11.00-12.00	15	59	63	59	55	75	61.5	71.5	57.0
13.00-14.00	16	50	65	59	55	77	62.2	73.1	65.0
14.00-15.00	14	50	63	59	55	73	60.7	70.4	57.0
15.00-16.00	15	50	63	59	55	71	60.5	69.9	57.0

SUMMARY OF NOISE LEVELS AT S-7 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 77 L_{10} = 63 L_{50} = 59 L_{90} = 55
L_{EQ} = 61.3 L_{DN} = 61.3 L_{NP} = 71.5 TNI = 57.0

HOURLY INFORMATION



S-8 MCLENNAN COMMUNITY COLLEGE

Population: (Census Tract #30)	
	1960 - 2121
	1970 - 2082
	1995 - 7670

Traffic Counts: (per day)	Location	1971	1980 (est.)
	(1)	3670	3960
	(2)	4130	18970
	(3)	9040	11880
	(4)	6360	16680

I. Land Use

Census Tract #30 drawing depicts the land use showing areas of:

A. Low density residential, mostly middle income dwellings.
B. High density residential sections are apartments.
C. Commercial sections are shopping centers and service stations.
D. Public and semi-public sections are a high school and junior college.

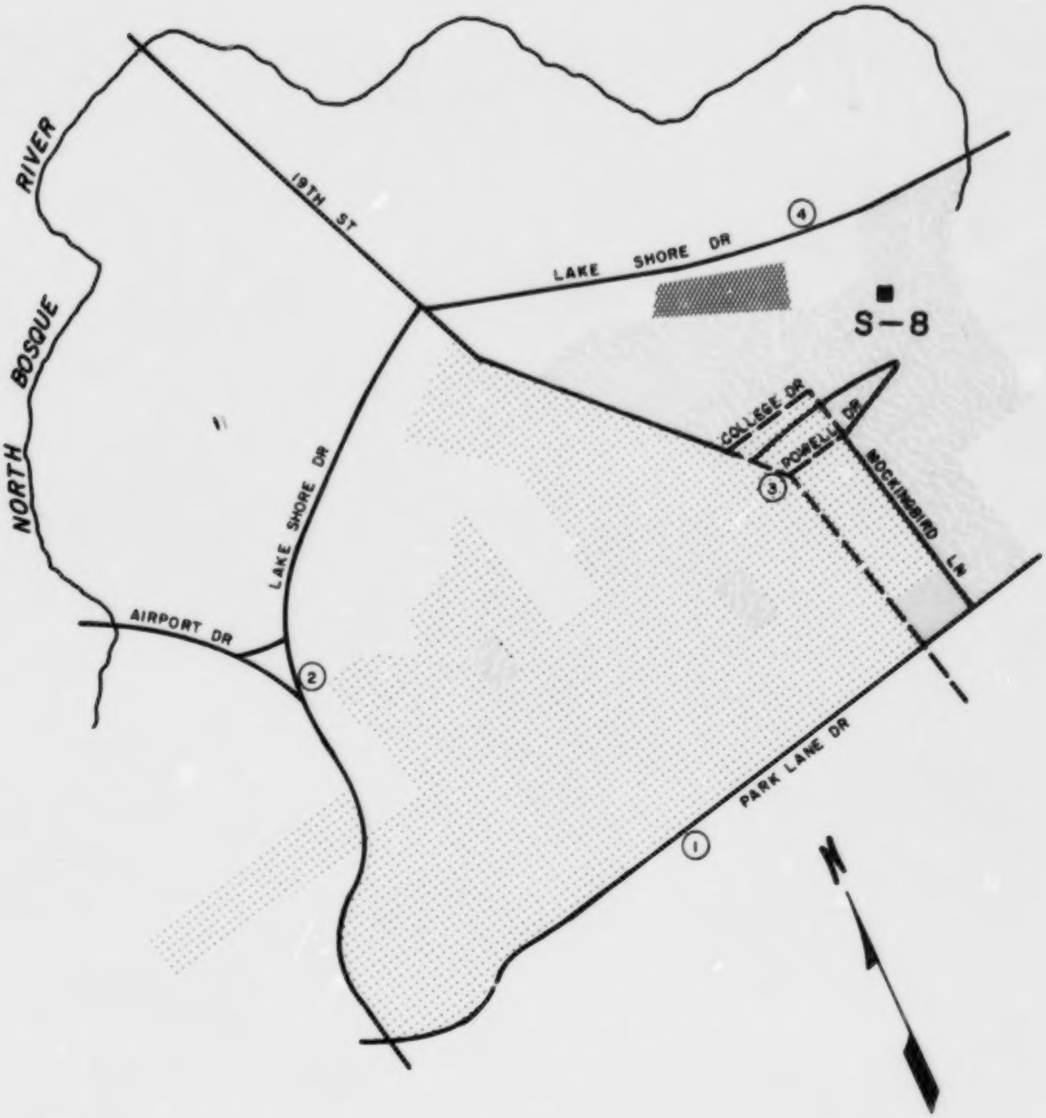
II. Traffic

Traffic count sites and bus routes are as amrked on drawing.

III. Noise Sources

Major: Automobile
Minor: Students, construction

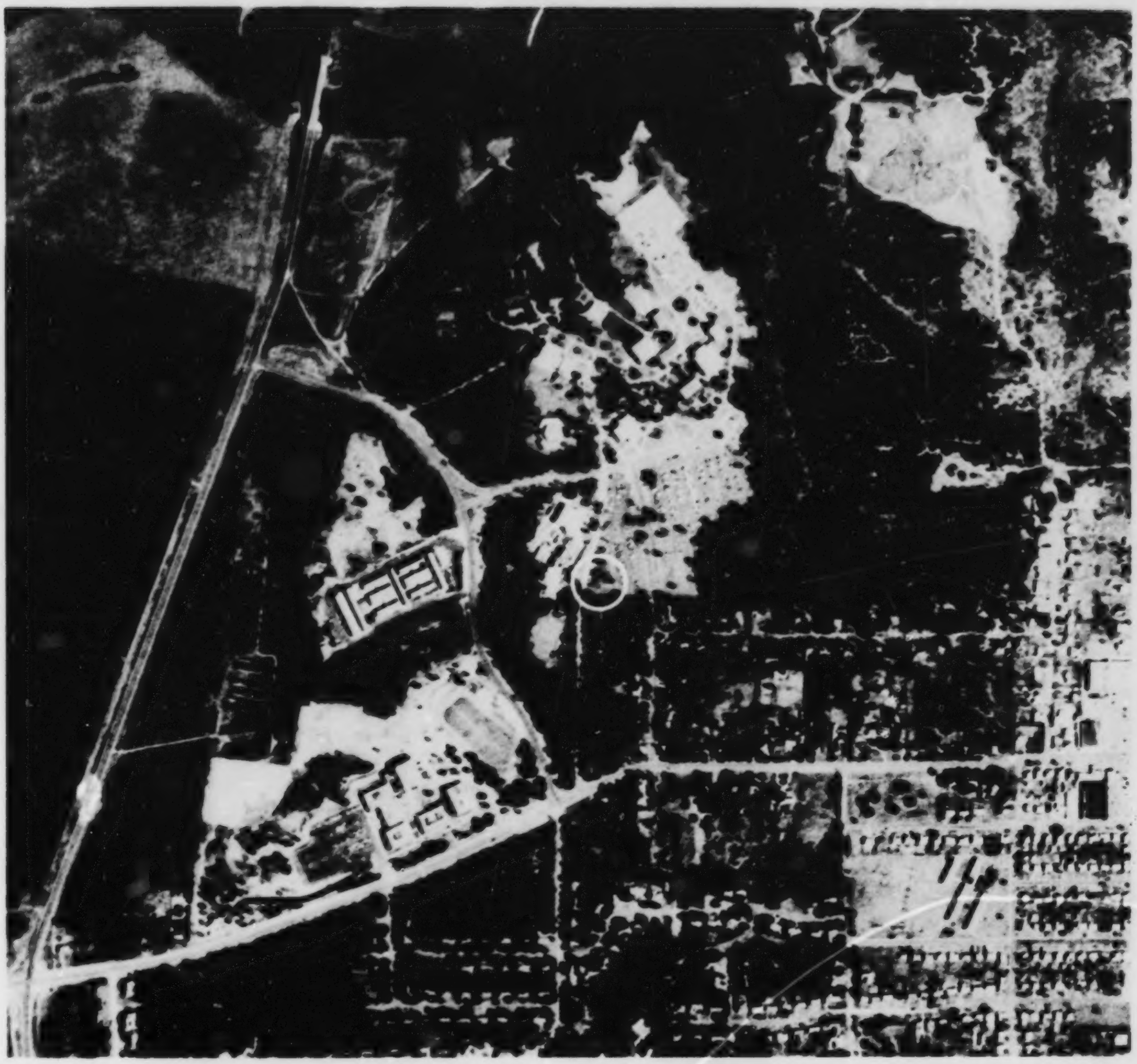
CENSUS TRACT NO. 30



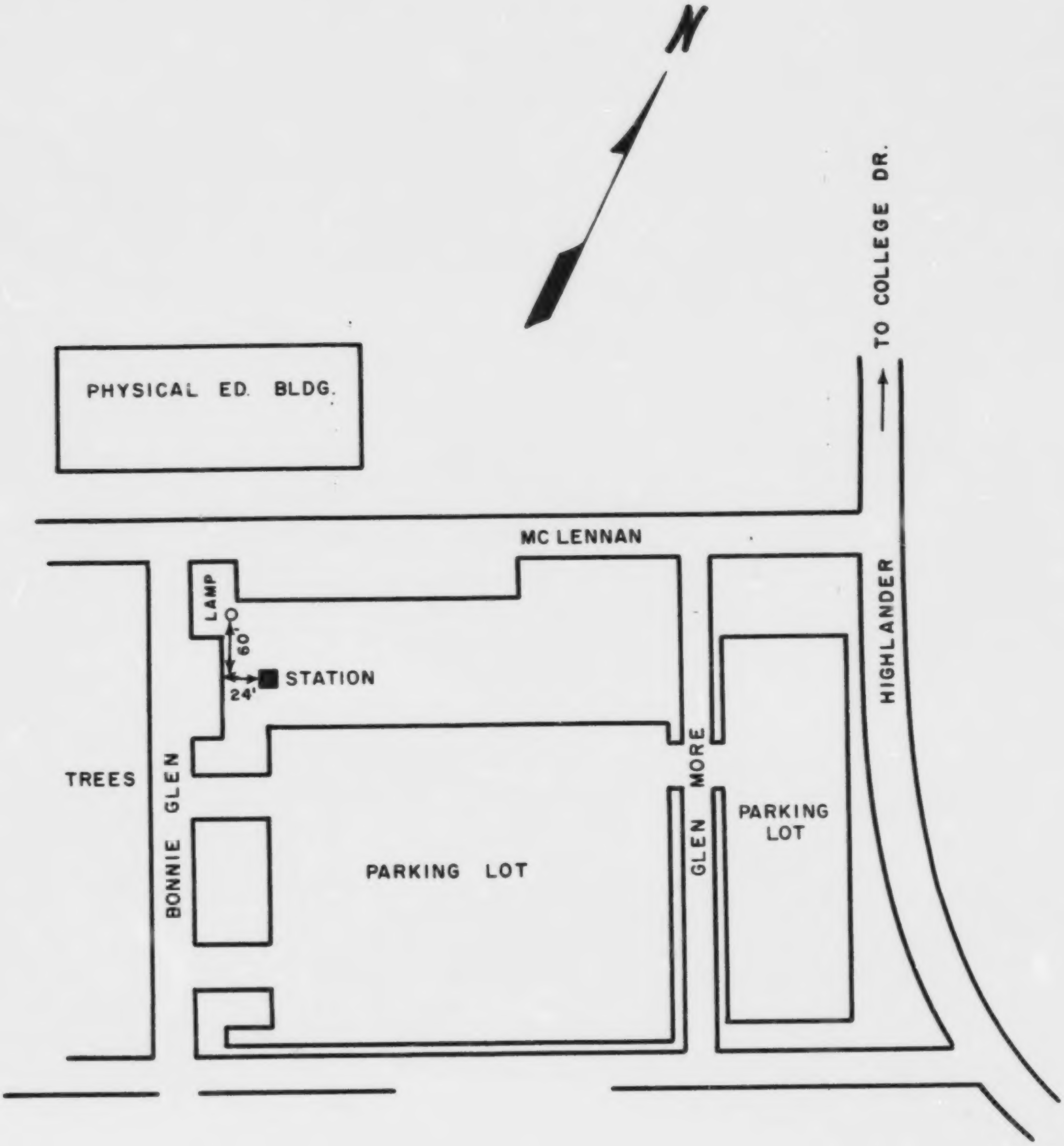
LEGEND

░ LOW DENSITY RESIDENTIAL
▓ HIGH DENSITY RESIDENTIAL
▒ COMMERCIAL
▒ PUBLIC & SEMI-PUBLIC

☐ VACANT
① TRAFFIC COUNT SITE
╌ BUS ROUTE



Aerial photograph of S-8.
Monitoring site is circled.



S-8 McLENNAN COMMUNITY COLLEGE

HOURLY "HAND-HELD METER" NOISE DATA AT S-8

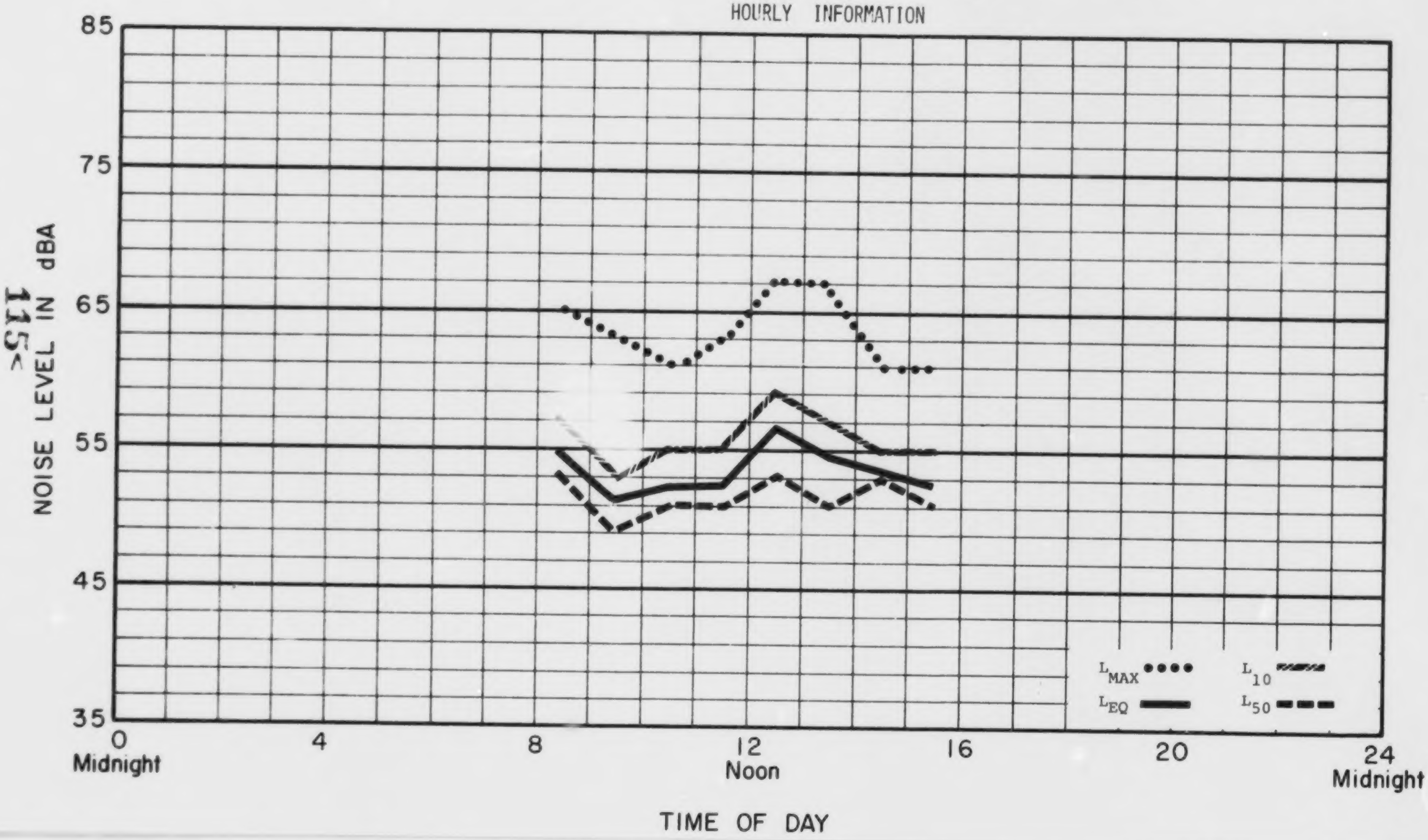
NOVEMBER 30, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 8.50	9	65	57	53	51	65	54.7	62.7	45.0
9.00 - 9.50	11	56	53	49	47	63	51.3	59.2	41.0
10.05-10.50	15	49	55	51	49	61	52.3	58.7	43.0
11.00-11.50	15	41	55	51	49	63	52.5	59.4	43.0
12.05-12.50	14	32	59	53	49	67	56.4	66.5	59.0
13.00-13.50	14	31	57	51	51	67	54.7	63.1	45.0
14.30-15.00	17	34	55	53	51	61	53.5	59.6	37.0
15.00-15.50	16	38	55	51	49	61	52.6	58.2	43.0

SUMMARY OF NOISE LEVELS AT S-8 FOR NOVEMBER 30, 1973

DAILY INFORMATION: L_{MAX} = 67 L_{10} = 55 L_{50} = 51 L_{90} = 49
L_{EQ} = 53.8 L_{DN} = 53.8 L_{NP} = 61.9 TNI = 43.0

HOURLY INFORMATION



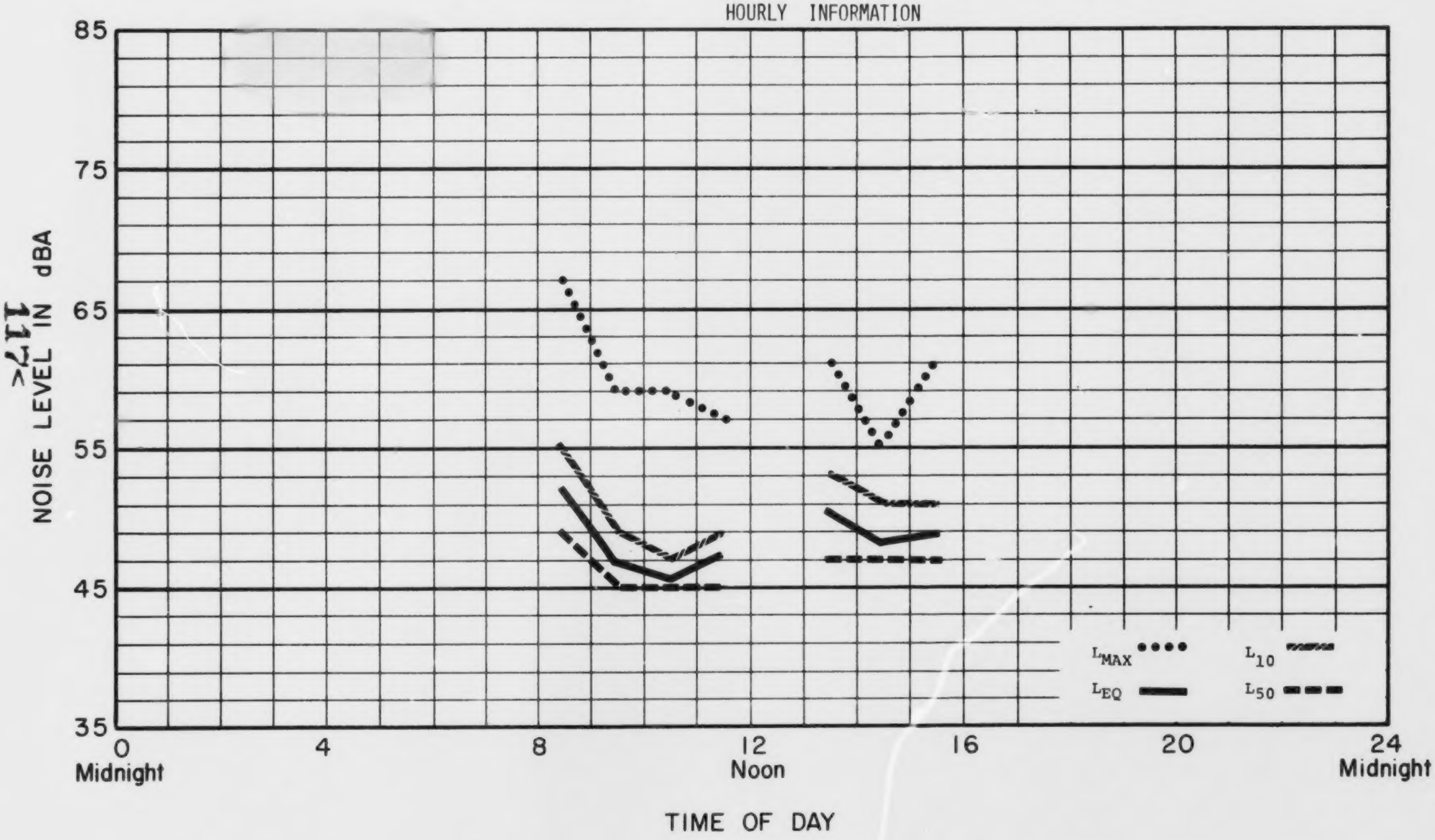
HOURLY "HAND-HELD METER" NOISE DATA AT S-8

DECEMBER 1, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 8.50	3	89	55	49	45	67	51.9	62.0	55.0
9.00 - 9.50	6	80	49	45	43	59	46.8	53.7	37.0
10.00-10.50	9	72	47	45	43	59	45.6	51.5	29.0
11.15-11.50	15	59	49	45	43	57	47.2	54.3	37.0
13.10-13.55	16	50	53	47	45	61	50.5	58.7	47.0
14.00-14.50	14	50	51	47	45	55	48.2	54.5	39.0
15.00-15.45	15	50	51	47	45	61	48.8	55.0	39.0

SUMMARY OF NOISE LEVELS AT S-8 FOR DECEMBER 1, 1973

DAILY INFORMATION: L_{MAX} = 67 L_{10} = 51 L_{50} = 47 L_{90} = 43
L_{EQ} = 49.0 L_{DN} = 49.0 L_{NP} = 57.3 TNI = 45.0



P-1 CITY HALL

Population: (Census Tract #1)
1960 - 3501
1970 - 2225
1995 - 1947 (est.)

Traffic Counts: (per day)	Location	1971	1980 (est.)
	(1)	6490	15050
	(2)	4520	9460
	(3)	13390	10770
	(4)	11140	10560
	(5)	27020	25030

I. Land Use

Census Tract #1 drawing depicts land use showing areas of:

A. Low density residential wich is now mostly low income families with a few exceptions between 12th and 17th Streets on Columbus, Washington, and Austin Avenues.

B. Commercial sections primarily occupied by older business.

C. Sizable sections are occupied by industry and the two railroad areas between Franklin and Clay.

D. Local government buildings, two large public schools, and ten large, older churches in the tract.

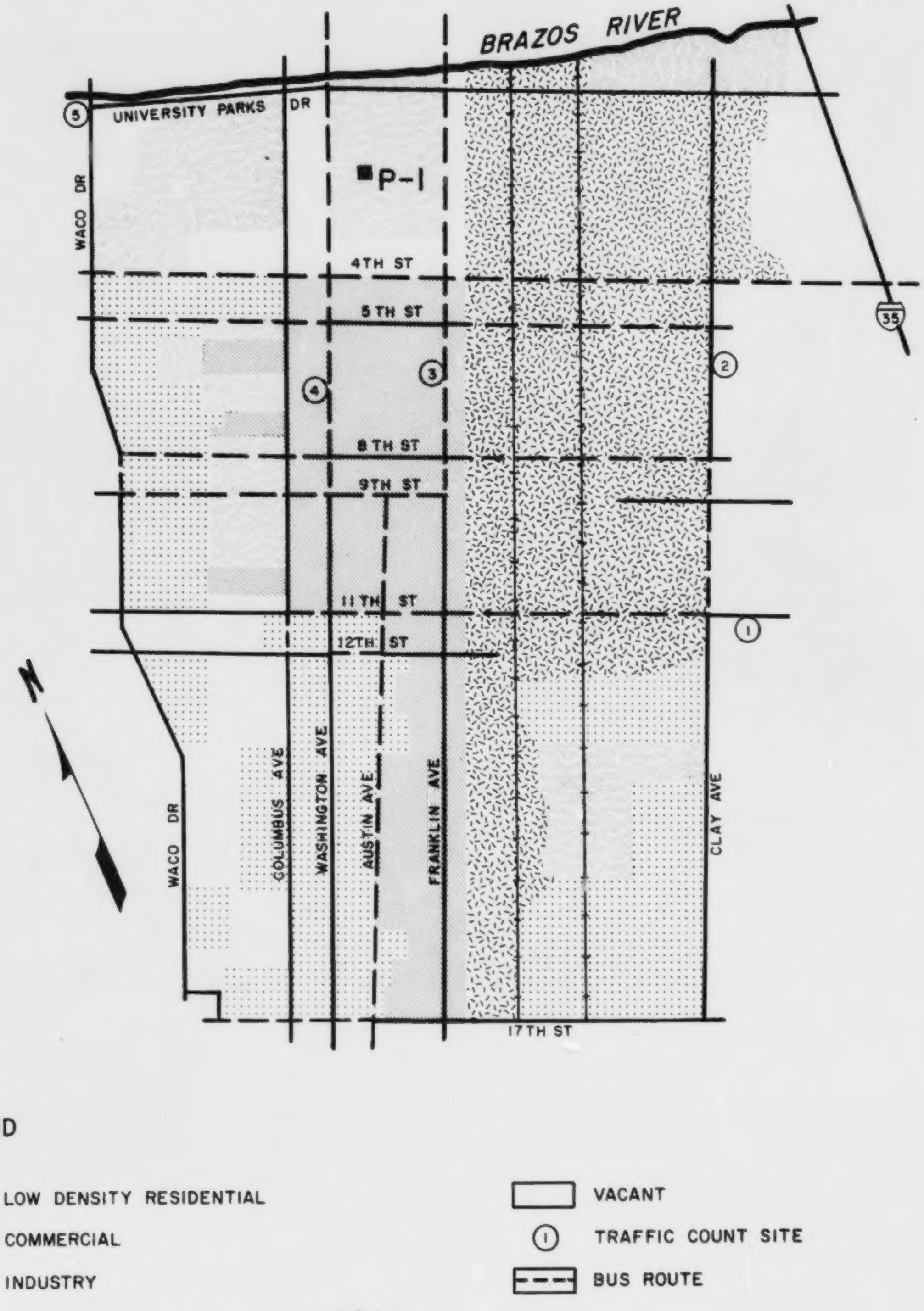
II. Traffic

See census map for traffic count locations and bus routes. The two railbeds are between Franklin and Clay.

III. Noise Sources

Major: Automobile, railcarrier
Minor: Truck, buses, birds, insects, light aircraft, railcarrier, motorcycle

CENSUS TRACT NO. 1



LEGEND

░ LOW DENSITY RESIDENTIAL

▒ COMMERCIAL

▓ INDUSTRY

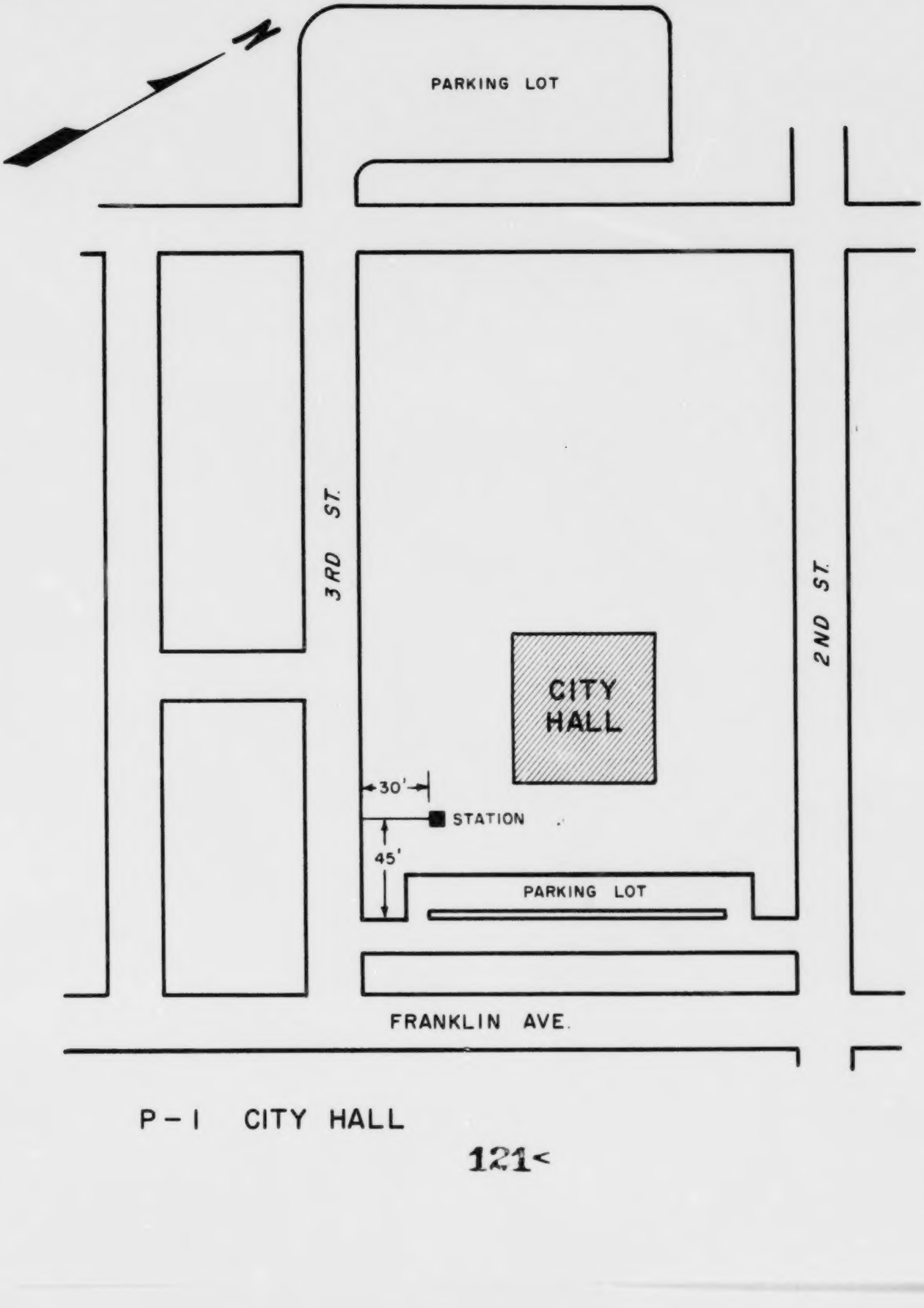
☐ PUBLIC & SEMI-PUBLIC

☐ VACANT

① TRAFFIC COUNT SITE

- - - BUS ROUTE

Aerial photograph of P-1.
Monitoring site is circled.


N
PARKING LOT
3RD ST.
2ND ST.
CITY HALL
30'
STATION
45'
PARKING LOT
FRANKLIN AVE.

P-1 CITY HALL

HOURLY "HAND-HELD METER" NOISE DATA AT P-1

DECEMBER 2, 1973

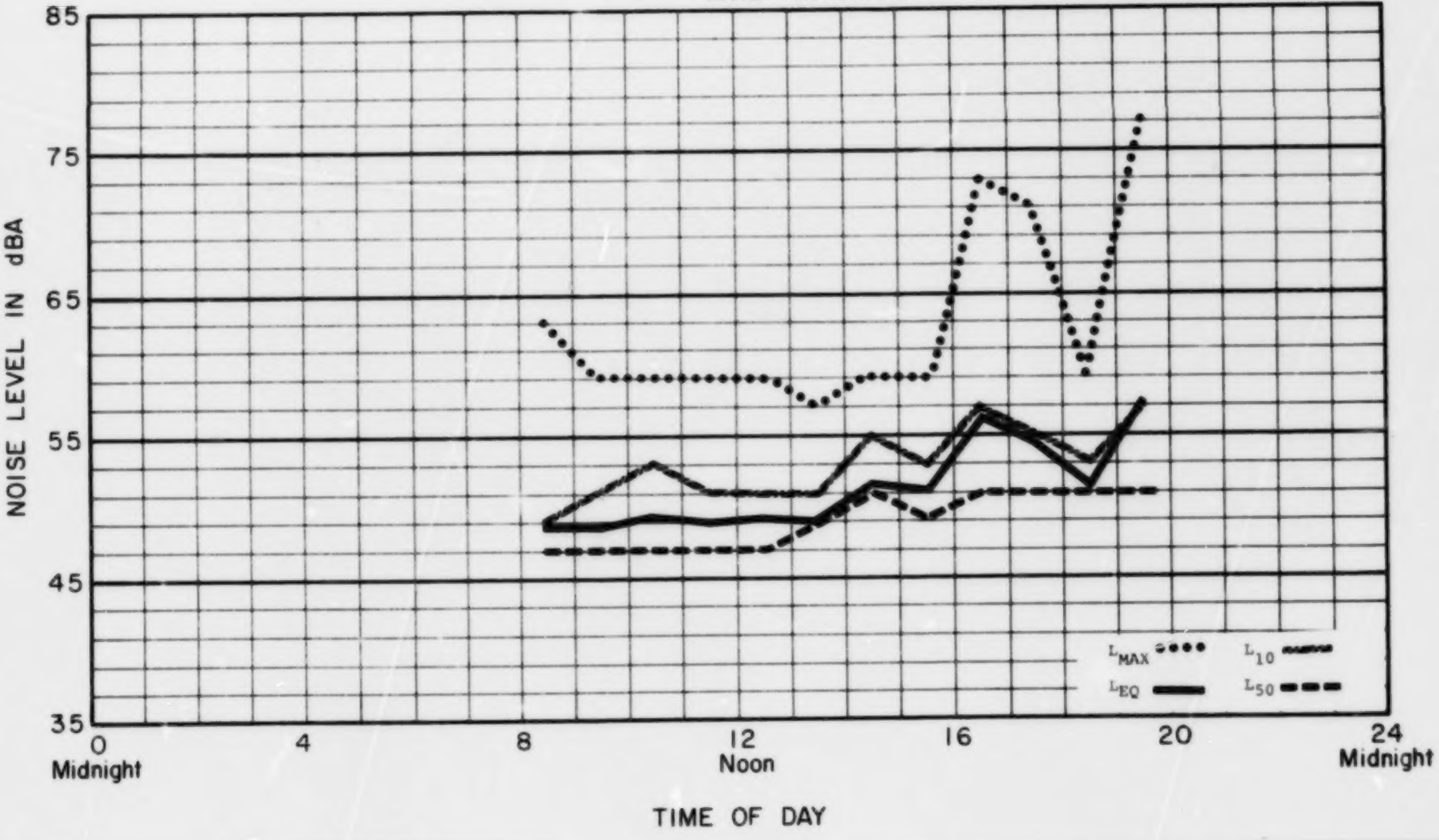
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 8.53	12	87	49	47	45	63	48.7	55.3	31.0
9.01 - 9.51	12	93	51	47	45	59	48.8	55.6	39.0
10.00-10.50	10	90	53	47	45	59	49.6	57.2	47.0
11.00-11.50	14	84	51	47	45	59	49.0	55.8	39.0
12.01-12.51	15	75	51	47	45	59	49.4	55.9	39.0
13.00-13.52	15	64	51	49	45	57	49.1	55.3	39.0
14.00-14.51	19	57	55	51	47	59	51.9	59.0	49.0
15.00-15.50	17	55	53	49	47	59	51.0	58.7	41.0
16.02-16.50	15	55	57	51	49	73	55.9	66.3	51.0
17.01-17.50	13	59	55	51	49	71	54.8	62.5	43.0
18.01-18.55	14	59	53	51	49	59	51.5	57.1	35.0
19.00-19.50	17	61	57	51	49	77	57.5	68.4	51.0

SUMMARY OF NOISE LEVELS AT P-1 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 77 L_{10} = 53 L_{50} = 49 L_{90} = 45

L_{EQ} = 52.6 L_{DN} = 52.6 L_{NP} = 61.6 TNI = 47.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-1

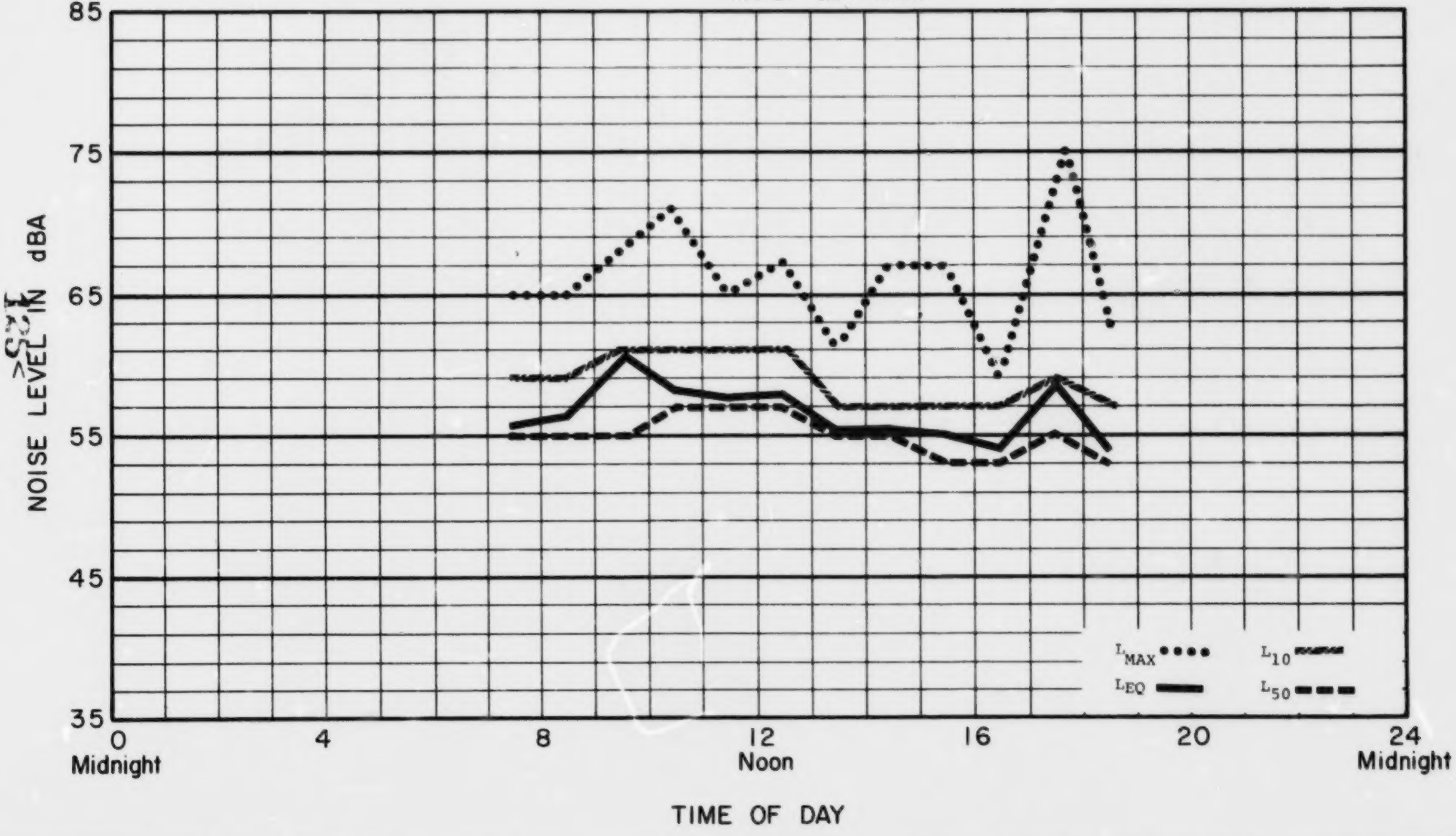
DECEMBER 3, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.01 - 7.51	17	87	59	55	51	65	55.7	62.7	53.0
8.00 - 8.55	13	90	59	55	53	65	56.3	62.3	47.0
9.00 - 9.50	14	90	61	55	53	75	61.0	72.2	55.0
10.00-10.53	16	87	61	57	53	71	58.1	65.7	55.0
11.00-11.47	17	82	61	57	55	65	57.5	63.7	49.0
12.14-12.55	18	82	61	57	55	67	57.9	64.3	49.0
13.00-13.50	16	70	57	55	51	61	55.5	61.7	45.0
14.01-14.55	14	55	57	55	53	67	55.5	61.3	39.0
15.00-15.56	17	30	57	53	51	67	55.1	61.7	45.0
16.06-16.52	15	29	57	53	51	59	54.2	60.5	45.0
17.00-17.50	9	32	59	55	51	73	58.8	69.6	53.0
18.00-18.50	15	32	57	53	49	63	53.9	61.4	51.0

SUMMARY OF NOISE LEVELS AT P-1 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 59 L_{50} = 55 L_{90} = 51
L_{EQ} = 57.0 L_{DN} = 57.0 L_{NP} = 65.2 TNI = 53.0

HOURLY INFORMATION



P-2 TEXAS STATE TECHNICAL INSTITUTE

Population: (Census Tract #33)	1960 - 4191 1970 - 2016 1995 - 4354 (est.)

	Location	1971	1980 (est.)
Traffic Count (per day)	(1)	4420	5800

I. Land Use

The T.S.T.I. proper line is within the Census Tract #33 and is shown in the attached drawing.

A. The low density residential sections are grouped around the T.S.T.I. campus.

B. The Institute buildings are contained within the sections devoted as public and semi-public.

II. Traffic

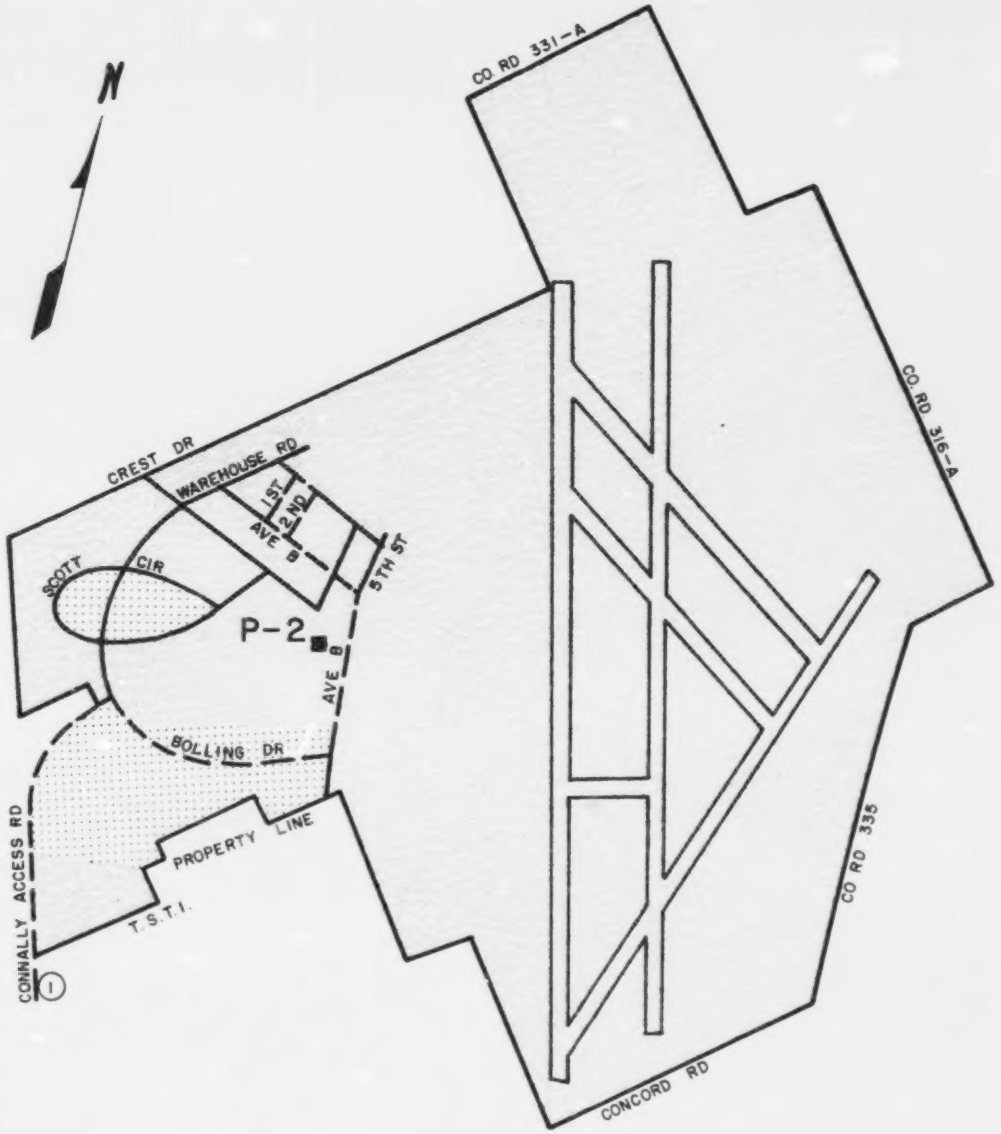
The traffic count site (1) is at the Main entrance road to the T.S.T.I. property. The single bus route in the bus line on campus moving to the city is shown. The major area is occupied by the air strip and its location in the T.S.T.I. property is clearly seen.

III. Noise Sources

Major: Automobile, railcarrier, truck, residents, construction

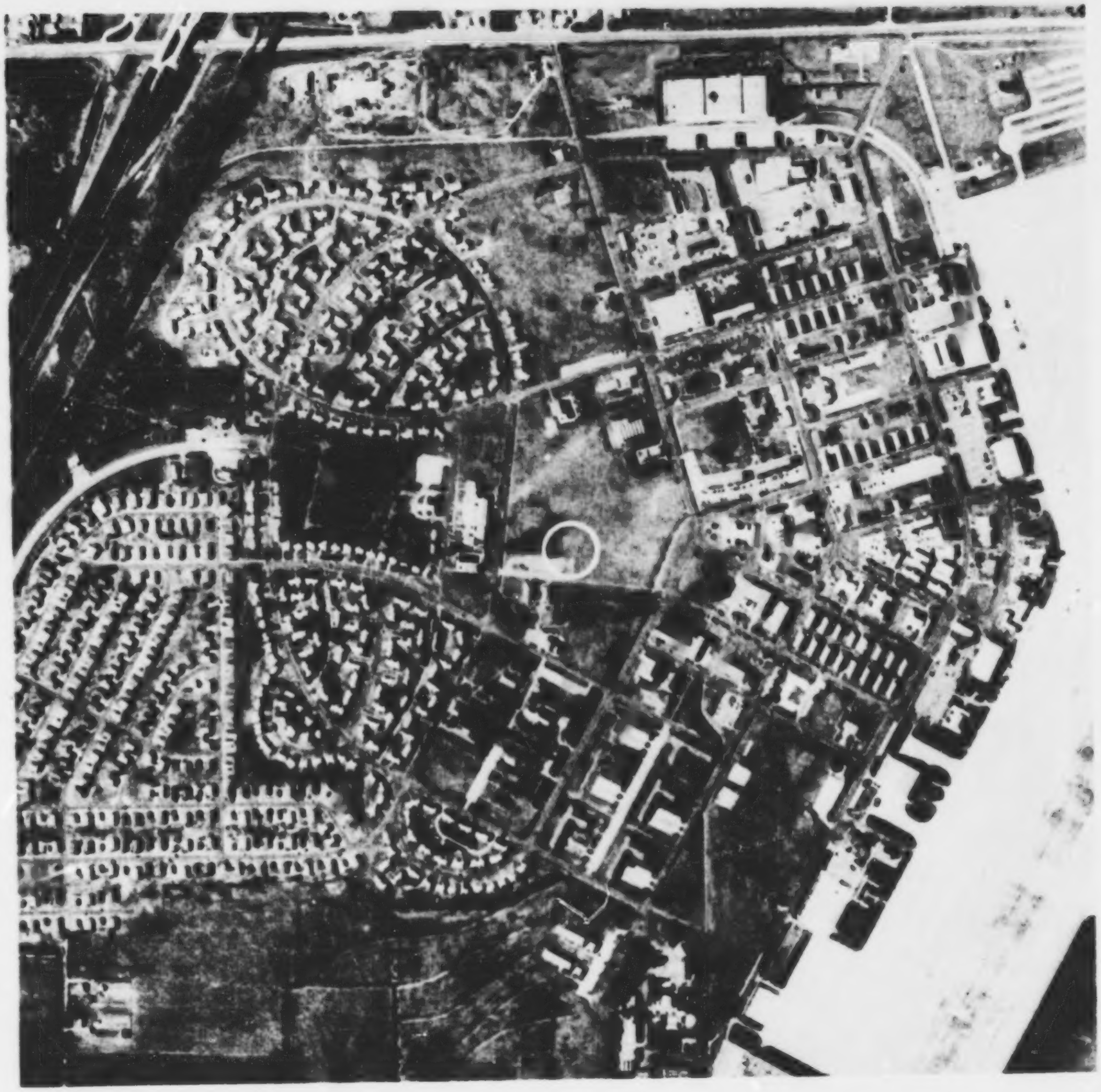
Minor: Railcarrier, truck, dogs, motorcycle, light aircraft, birds

CENSUS TRACT NO. 33

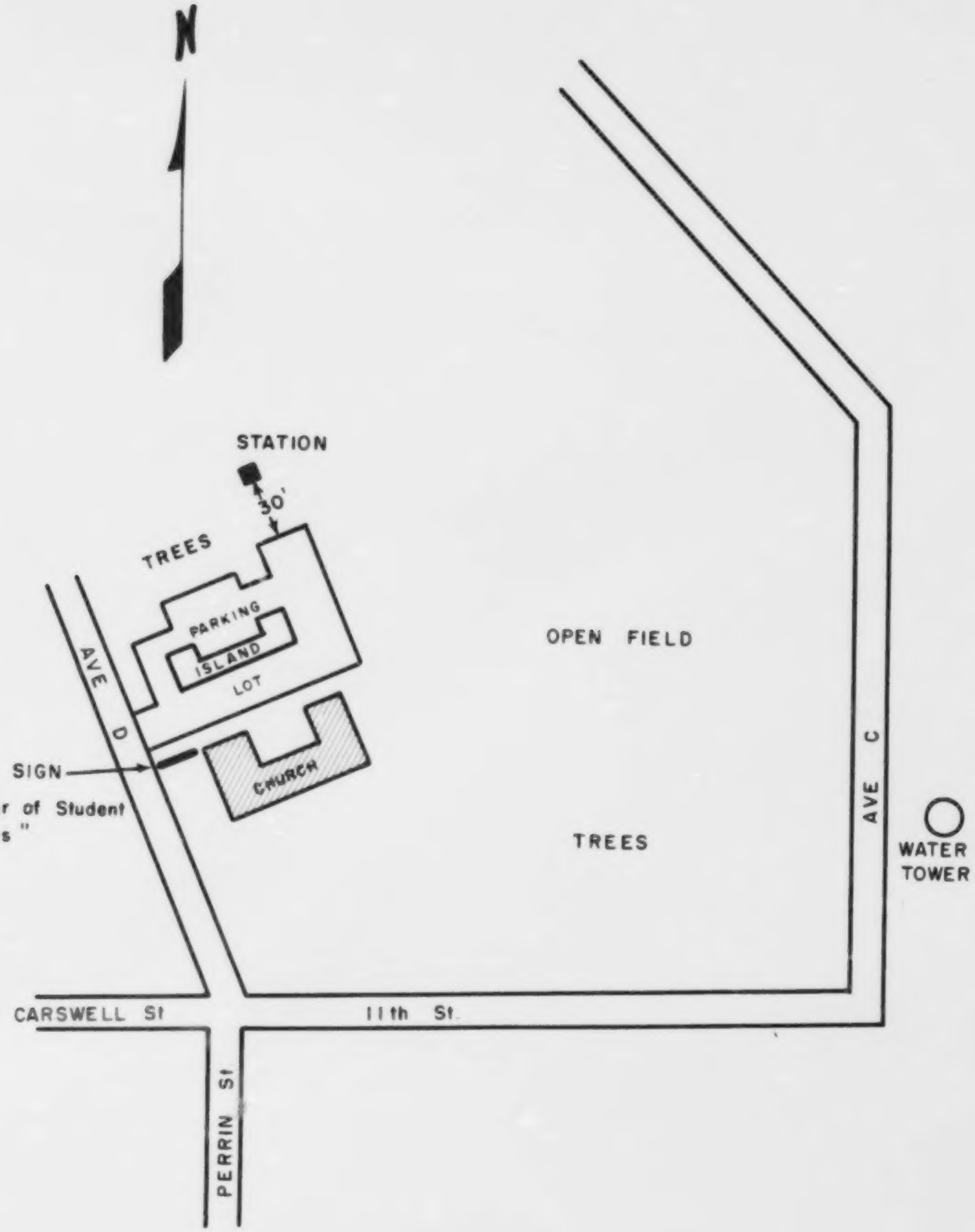


LEGEND

▨ LOW DENSITY RESIDENTIAL
☐ PUBLIC & SEMI-PUBLIC
① TRAFFIC COUNT SITE
- - - BUS ROUTE



Aerial photograph of P-2.
Monitoring site is circled.



P-2 TEXAS STATE TECHNICAL INSTITUTE

HOURLY "HAND-HELD METER" NOISE DATA AT P-2

DECEMBER 2, 1973

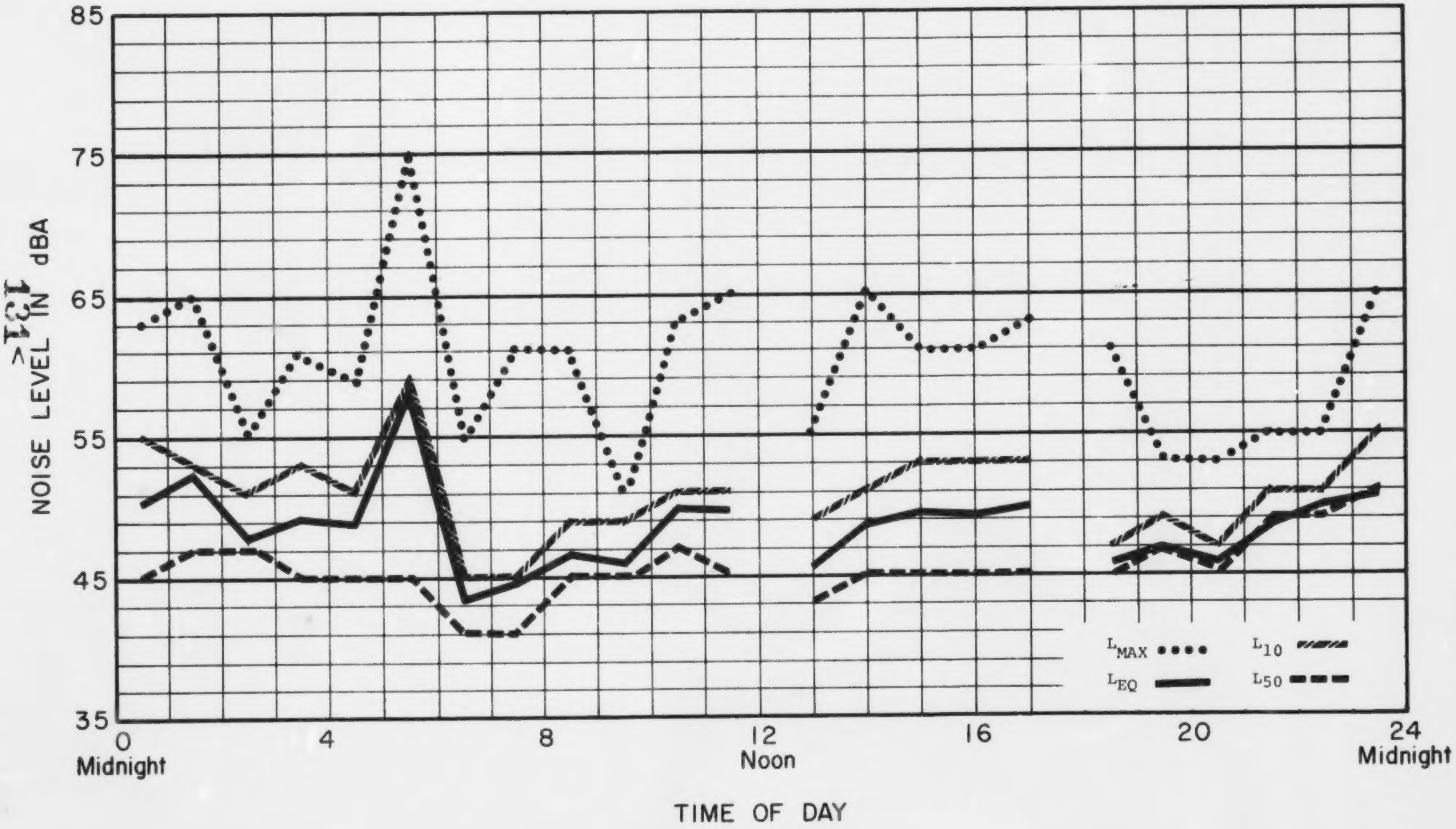
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.00 - 0.50	13	78	55	45	41	63	50.4	62.7	67.0
1.00 - 1.50	13	83	53	47	43	65	52.3	64.6	53.0
2.00 - 2.51	12	87	51	47	43	55	47.9	55.3	45.0
3.00 - 3.50	12	87	53	45	43	61	49.1	58.7	53.0
4.00 - 4.50	12	90	51	45	43	59	48.8	58.5	45.0
5.00 - 5.50	9	93	59	45	41	75	57.9	77.5	83.0
6.00 - 6.50	10	97	45	41	41	55	43.3	49.1	27.0
7.00 - 7.50	9	93	45	41	37	61	44.6	53.2	39.0
8.00 - 8.50	12	93	49	45	41	61	46.6	54.9	43.0
9.00 - 9.50	10	90	49	45	43	51	46.2	52.9	37.0
10.00 -10.51	14	84	51	47	45	63	49.9	58.0	39.0
11.00 -11.50	15	75	51	45	43	65	49.6	59.5	45.0
12.30 -13.30	15	64	49	43	41	55	45.5	53.8	43.0
14.30 -15.30	17	55	53	45	43	61	49.6	59.4	53.0
15.30 -16.30	15	55	53	45	41	61	49.3	60.6	59.0
16.30 -17.30	13	59	53	45	43	63	50.2	60.8	53.0
18.00 -19.00	17	51	47	45	41	61	45.9	52.4	35.0
19.00 -20.00	21	70	49	47	45	53	47.0	51.4	31.0
20.00 -21.00	20	70	47	45	43	53	45.9	51.8	29.0
21.00 -22.00	21	75	51	49	47	55	48.8	53.2	33.0
22.00 -23.00	15	81	51	49	47	55	50.1	54.6	33.0
23.00 -24.00	15	81	55	51	47	65	52.8	61.6	49.0

SUMMARY OF NOISE LEVELS AT P-2 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 51 L_{50} = 45 L_{90} = 41

L_{EQ} = 50.1 L_{DN} = 58.2 L_{NP} = 60.8 TNI = 51.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-2

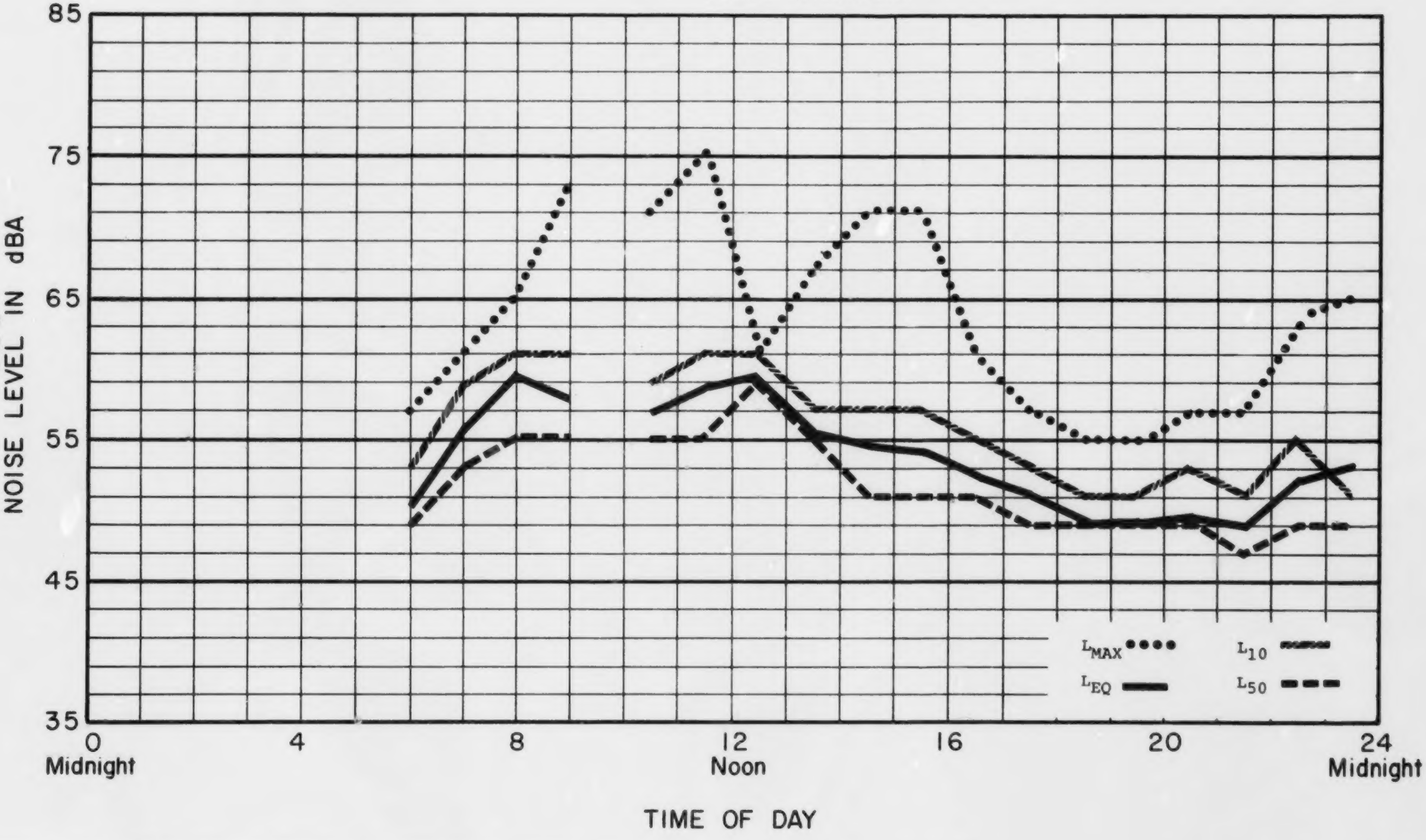
DECEMBER 3, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
1.30 - 1.50	17	84	53	49	45	61	50.7	58.6	47.0
2.30 - 3.20	20	90	53	49	45	61	50.0	57.5	47.0
4.00 - 4.50	20	90	53	49	45	59	50.4	57.3	47.0
5.30 - 6.20	19	90	49	43	41	57	56.2	54.8	43.0
6.30 - 7.20	17	87	53	49	47	61	50.6	56.9	41.0
7.30 - 8.18	13	90	59	53	51	65	56.0	64.4	53.0
8.30 - 9.20	14	90	61	55	53	73	59.8	70.7	55.0
9.30 -10.00	14	87	61	55	53	61	56.9	62.8	55.0
10.00 -10.50	17	82	59	55	51	71	57.0	65.3	53.0
11.00 -11.30	17	82	61	55	51	75	58.5	67.9	61.0
12.00 -13.00	16	70	61	59	57	61	59.5	62.8	43.0
13.00 -14.00	14	55	57	55	51	67	55.6	62.1	45.0
14.00 -15.00	17	30	57	51	49	71	54.8	63.5	51.0
15.00 -16.00	15	29	57	51	49	71	54.1	62.5	51.0
16.00 -17.00	9	32	55	51	49	61	52.5	59.5	43.0
17.00 -18.00	15	32	53	51	49	57	51.1	56.0	35.0
18.00 -19.00	11	29	51	49	47	55	49.2	54.0	33.0
19.00 -20.00	14	27	51	49	47	55	49.1	54.3	33.0
20.00 -21.00	10	35	53	49	45	57	49.6	56.6	47.0
21.00 -22.00	9	40	51	47	45	57	49.0	56.0	39.0
22.00 -23.00	17	40	55	49	49	63	52.4	60.8	43.0
23.00 -24.00	17	34	53	49	47	65	53.2	62.1	41.0

SUMMARY OF NOISE LEVELS AT P-2 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 57 L_{50} = 51 L_{90} = 47
L_{EQ} = 53.9 L_{DN} = 59.0 L_{NP} = 64.6 TNI = 57.0

HOURLY INFORMATION



P-3 V. A. HOSPITAL

Population: 1960 - 2007
(Census Tract #22) 1970 - 1468
1995 - 16 (est.)

Traffic Count	Location	1971	1980 (est.)
	(1)	1010	4120

I. Land Use

Census Tract #22 drawing shows the land use areas.

A. The primary use is public and semi-public, the VA Hospital and supporting units.

B. Almost all of the remaining property is vacant.

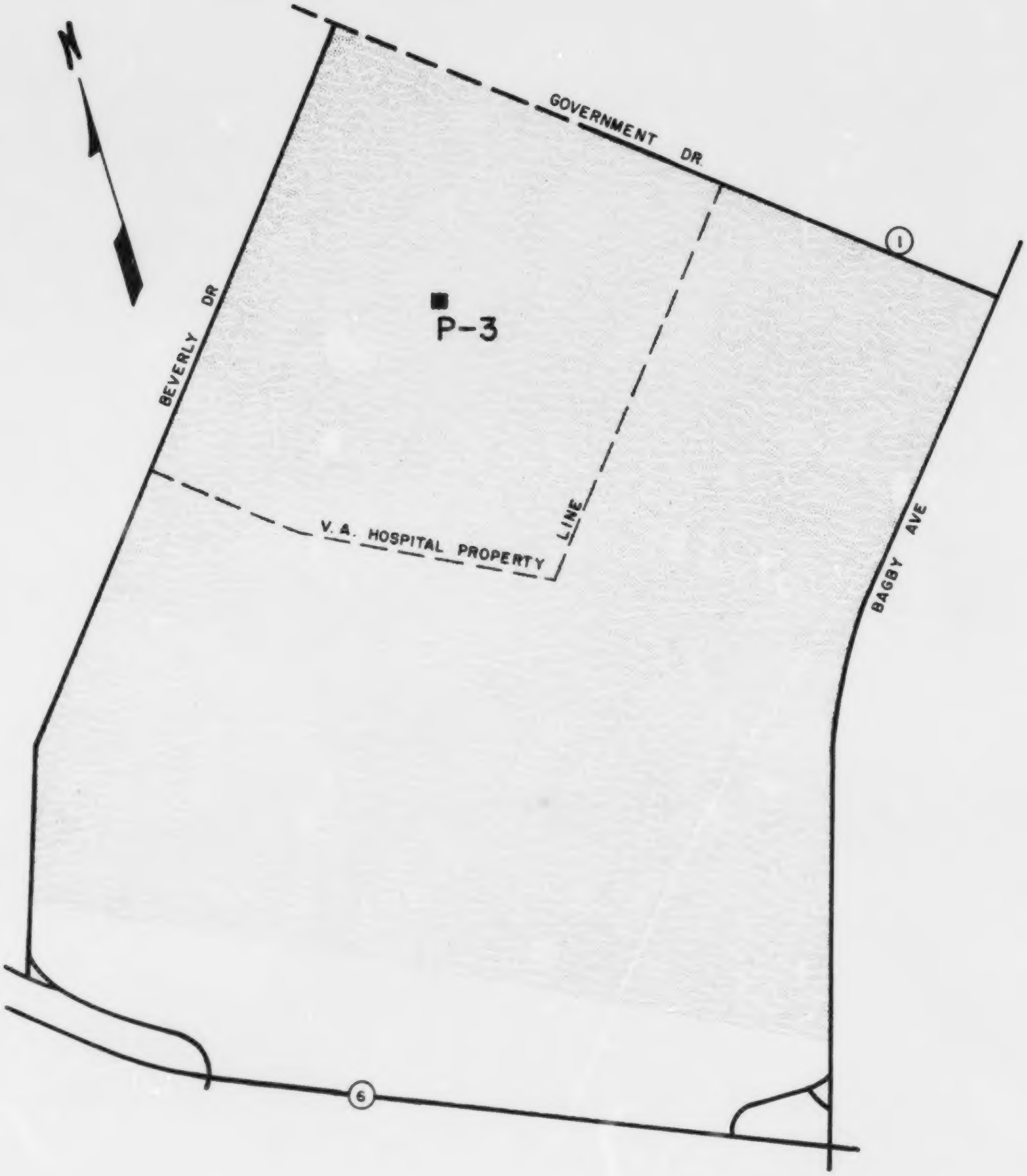
II. Traffic

The one traffic count reflects the movement on the main road bordering the NE side of the VA property. A count from Hwy. 6 near the VA wasn't available. The railroad lines are fairly near to the NW and a large industry, Owen-Illinois is within a mile-NNW.

III. Noise Sources

Major: Truck, light aircraft, railcarrier, residents

CENSUS TRACT NO. 22



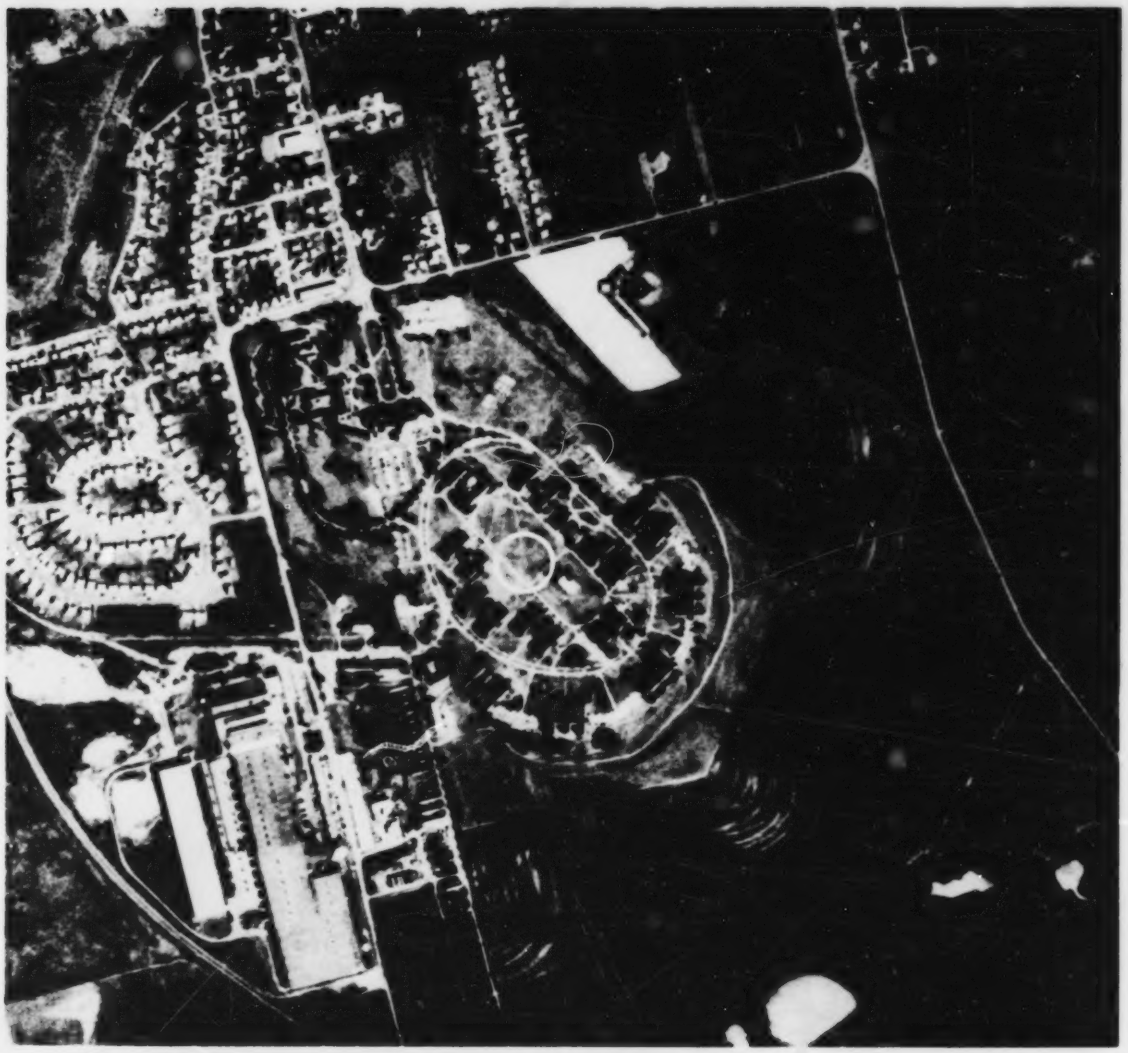
LEGEND

▨ PUBLIC & SEMI-PUBLIC

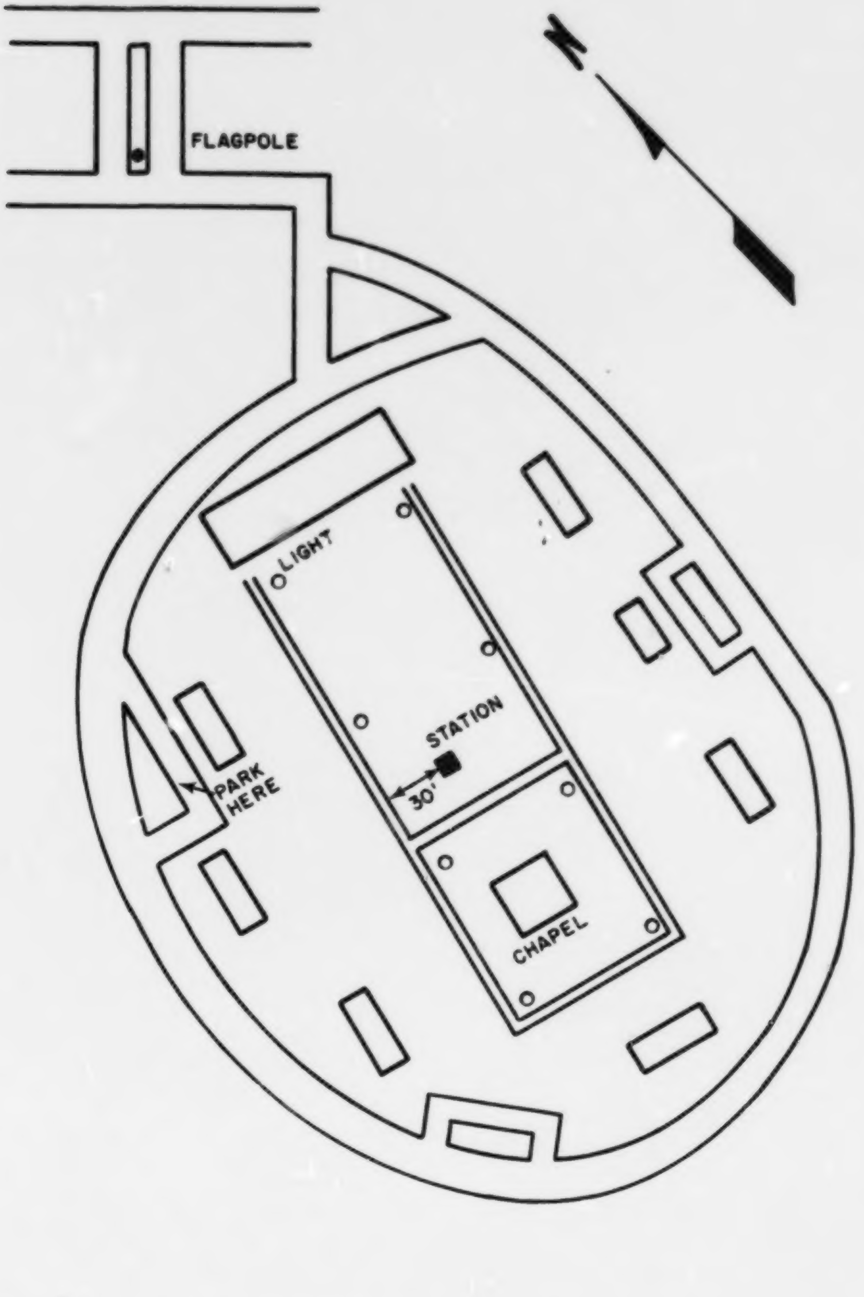
☐ VACANT

① TRAFFIC COUNT SITE

- - - BUS ROUTE



Aerial photograph of P-3.
Monitoring site is circled.



P–3 V. A. HOSPITAL

HOURLY "HAND-HELD METER" NOISE DATA AT P-3

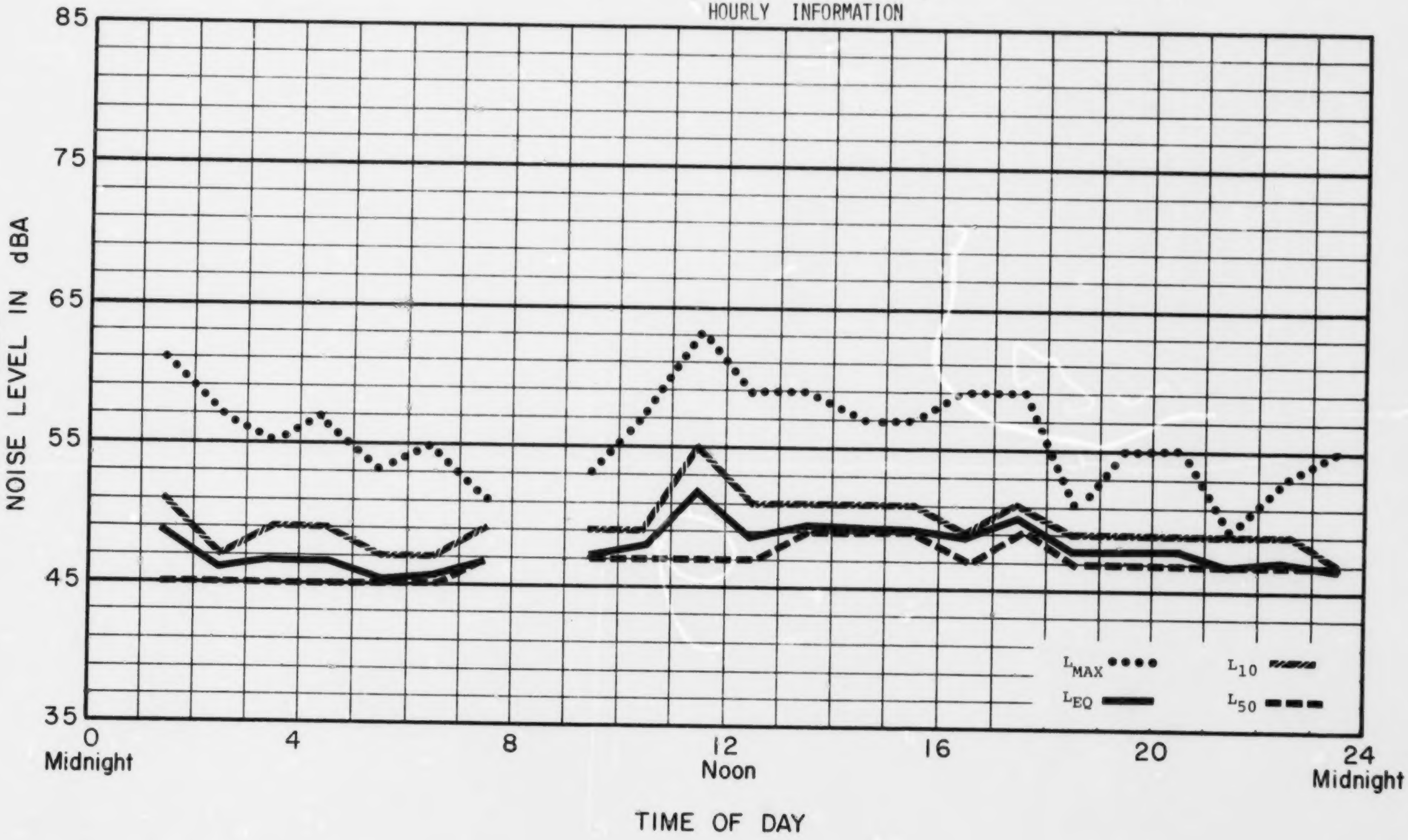
DECEMBER 2, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
1.30 - 1.50	14	78	51	45	45	61	48.6	57.3	39.0
2.00 - 2.50	14	83	47	45	43	57	46.0	51.3	29.0
3.00 - 3.50	12	87	49	45	45	55	46.8	52.8	31.0
4.00 - 4.50	12	87	49	45	43	57	46.7	52.9	37.0
5.00 - 5.50	12	90	47	45	43	53	45.5	49.2	29.0
6.05 - 6.50	9	93	47	45	43	55	45.8	49.5	29.0
7.00 - 7.50	10	97	49	47	45	51	46.7	50.5	31.0
9.00 - 9.30	12	93	49	45	45	51	46.1	49.8	31.0
9.40 -10.00	12	93	49	47	45	53	47.2	51.0	31.0
10.00 -11.00	10	90	49	47	45	57	48.1	53.8	31.0
11.00 -11.30	14	84	55	47	47	63	51.8	61.7	49.0
11.45 -12.45	15	75	51	47	45	59	48.7	54.6	39.0
12.45 -13.45	15	64	51	49	47	59	49.5	55.0	33.0
13.45 -14.45	19	57	51	49	47	57	49.2	54.3	33.0
14.45 -15.45	17	55	51	49	47	57	49.1	54.0	33.0
15.45 -16.45	15	55	49	47	47	59	48.8	53.6	25.0
17.00 -18.00	13	59	51	49	47	59	50.0	56.1	33.0
18.00 -19.00	14	59	49	47	47	51	47.8	50.4	25.0
19.00 -20.00	17	61	49	47	47	55	48.0	51.1	25.0
20.00 -21.00	21	70	49	47	47	55	47.9	51.8	25.0
21.00 -22.00	20	70	49	47	45	49	46.9	49.9	31.0
22.00 -23.00	21	75	49	47	45	53	47.1	50.5	31.0
23.00 -23.50	15	81	47	47	45	55	46.8	50.0	23.0

SUMMARY OF NOISE LEVELS AT P-3 FOR DECEMBEP 2, 1973

DAILY INFORMATION: L_{MAX} = 63 L_{10} = 49 L_{50} = 47 L_{90} = 45
L_{EQ} = 48.0 L_{DN} = 53.3 L_{NP} = 53.8 TNI = 31.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-3

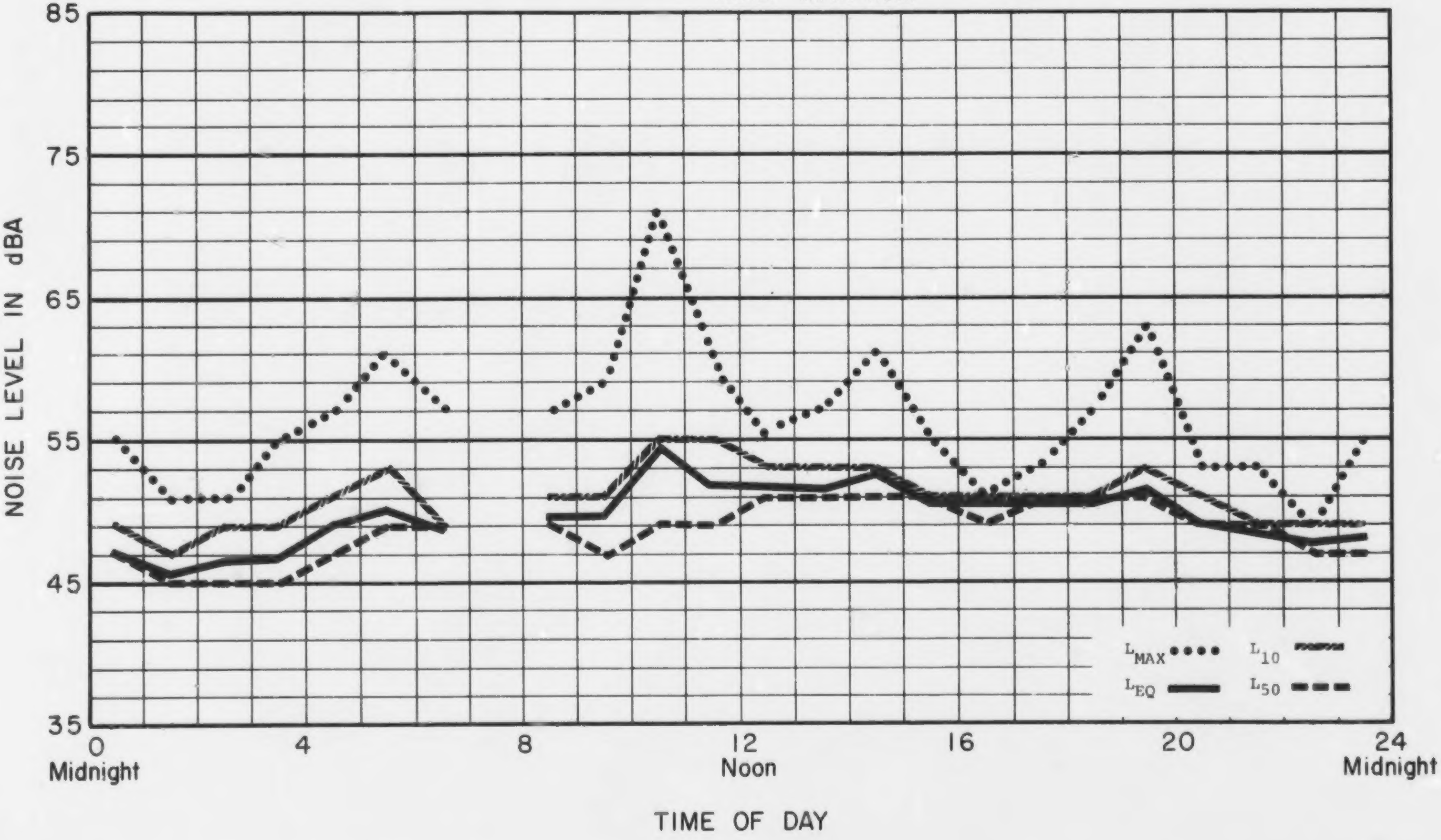
DECEMBER 3, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.20 - 0.55	15	81	49	47	45	55	47.1	52.6	31.0
1.00 - 1.50	17	84	47	45	43	51	45.7	50.4	29.0
2.00 - 2.50	20	87	49	45	45	51	46.5	51.1	31.0
3.00 - 3.50	20	90	49	45	45	55	46.9	52.0	31.0
4.00 - 4.50	20	90	51	47	45	57	49.1	55.6	39.0
5.00 - 5.50	20	90	53	49	47	61	50.2	57.6	41.0
6.00 - 6.50	19	90	49	49	47	57	48.9	53.3	25.0
8.00 - 8.50	13	90	51	49	47	57	49.5	54.8	33.0
9.00 - 9.50	14	90	51	47	47	59	49.6	55.7	33.0
10.00 -10.50	16	87	55	49	47	71	54.4	64.2	49.0
11.00 -11.40	17	82	55	49	47	61	51.7	59.4	49.0
11.45 -12.45	18	82	53	51	49	55	51.5	55.8	35.0
12.50 -13.50	16	70	53	51	49	57	51.4	55.2	35.0
13.50 -14.50	14	55	53	51	49	61	52.4	58.1	35.0
14.50 -15.50	17	30	51	51	49	55	50.5	53.4	27.0
15.50 -16.50	15	29	51	49	49	51	50.1	52.6	27.0
16.55 -17.55	9	32	51	51	49	53	50.4	53.6	27.0
17.55 -18.55	15	32	51	51	49	57	50.3	53.5	27.0
18.55 -19.55	10	29	53	51	49	63	51.5	56.8	35.0
19.55 -20.55	14	27	51	49	47	53	49.0	52.2	33.0
20.55 -21.55	10	35	49	49	47	53	48.3	51.5	25.0
21.55 -22.55	9	40	49	47	47	49	47.8	50.2	25.0
22.55 -23.55	17	40	49	47	47	55	48.0	51.3	25.0

SUMMARY OF NOISE LEVELS AT P-3 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 71 L_{10} = 51 L_{50} = 49 L_{90} = 45
L_{EQ} = 50.1 L_{DN} = 54.9 L_{NP} = 56.7 TNI = 39.0

HOURLY INFORMATION



P-4 UNIVERSITY HIGH SCHOOL

Population: 1960 - 6842
(Census Tract #5) 1970 - 5749
1995 - 5281 (est.)

Traffic Count (per day)	Location	1971	1980 (est.)
	(1)	24910	48090
	(2)	15130	18310

I. Land Use

Census Tract #5 drawing depicts the Land Use showing areas of:

A. Low density residential sections of lower middle class dwellings and high density residential of multiple units (one-two stories).

B. The industry and railroads sections are on the NW border.

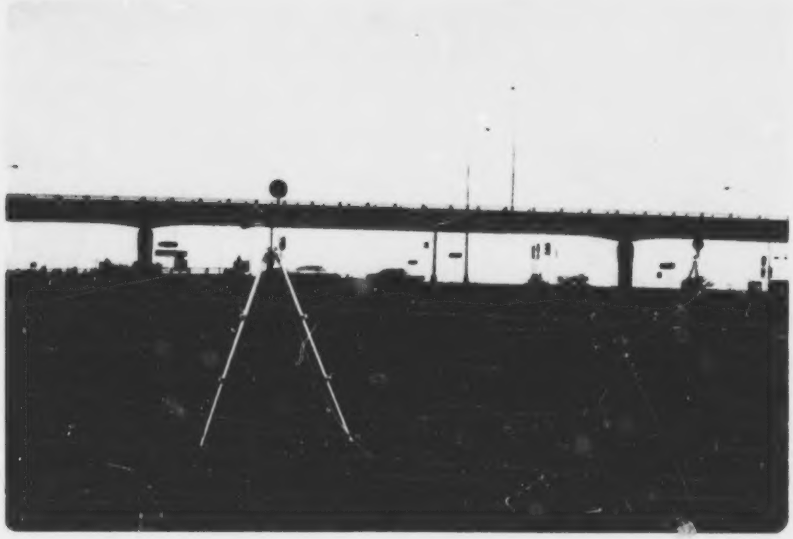
C. The public and semi-public are primarily schools (including Baylor Stadium properties) and several medium-size churches.

II. Traffic

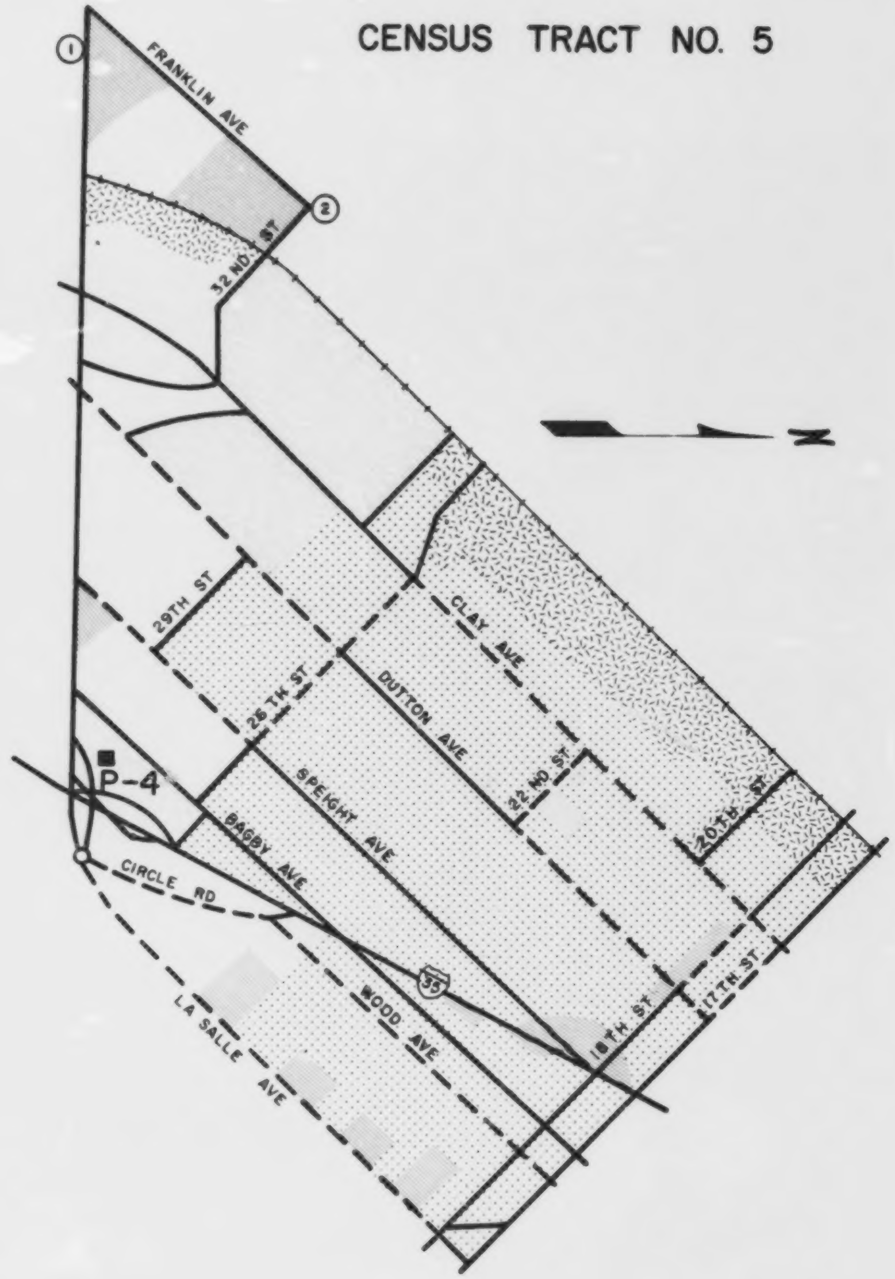
The traffic count sites are note that relate to the area. I-35 counts are given at other points. The bus routes through the tract are located as shown.

III. Noise Sources

Major: Automobiles, trucks, motorcycle
Minor: Birds, light aircraft

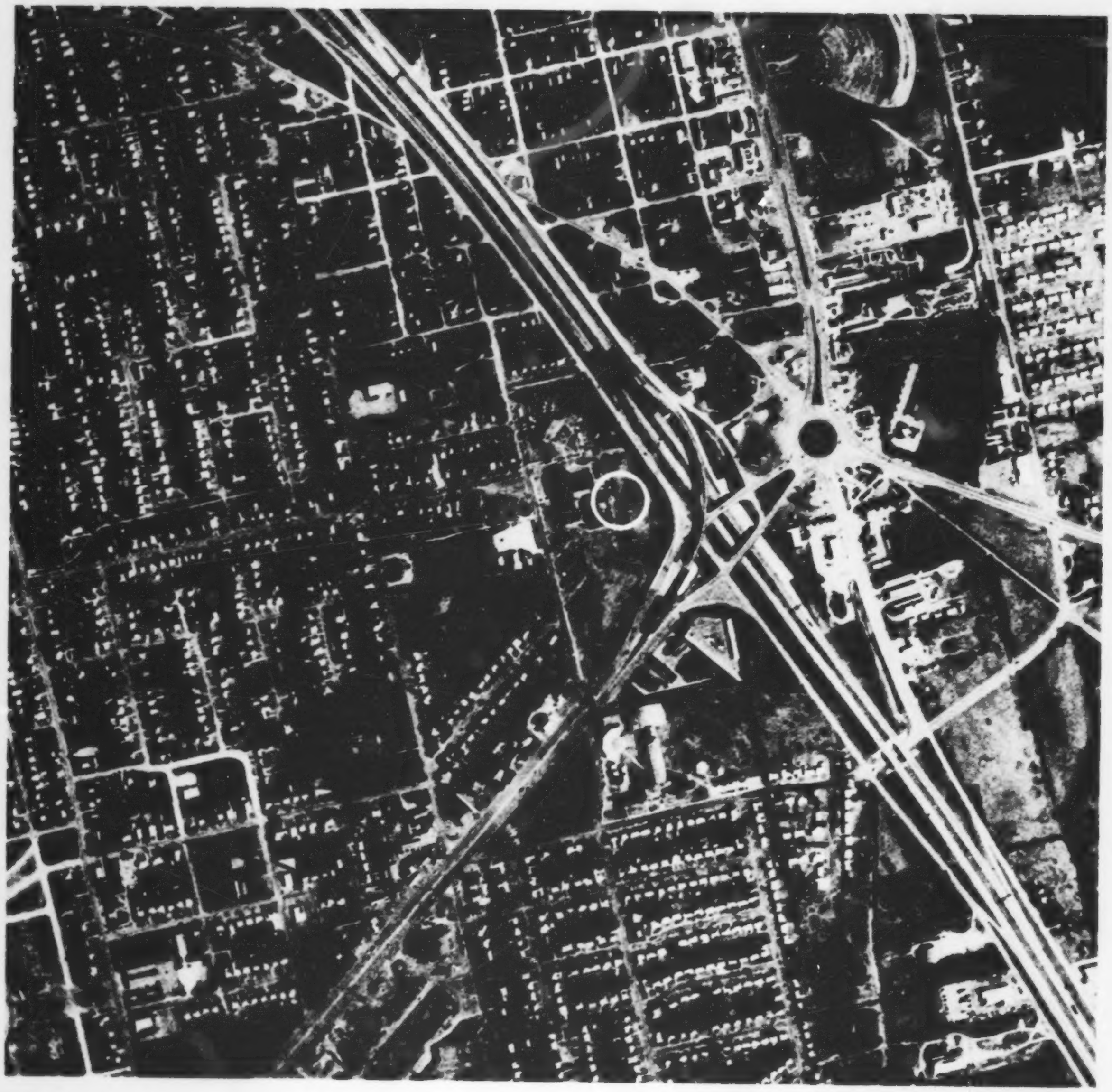


CENSUS TRACT NO. 5

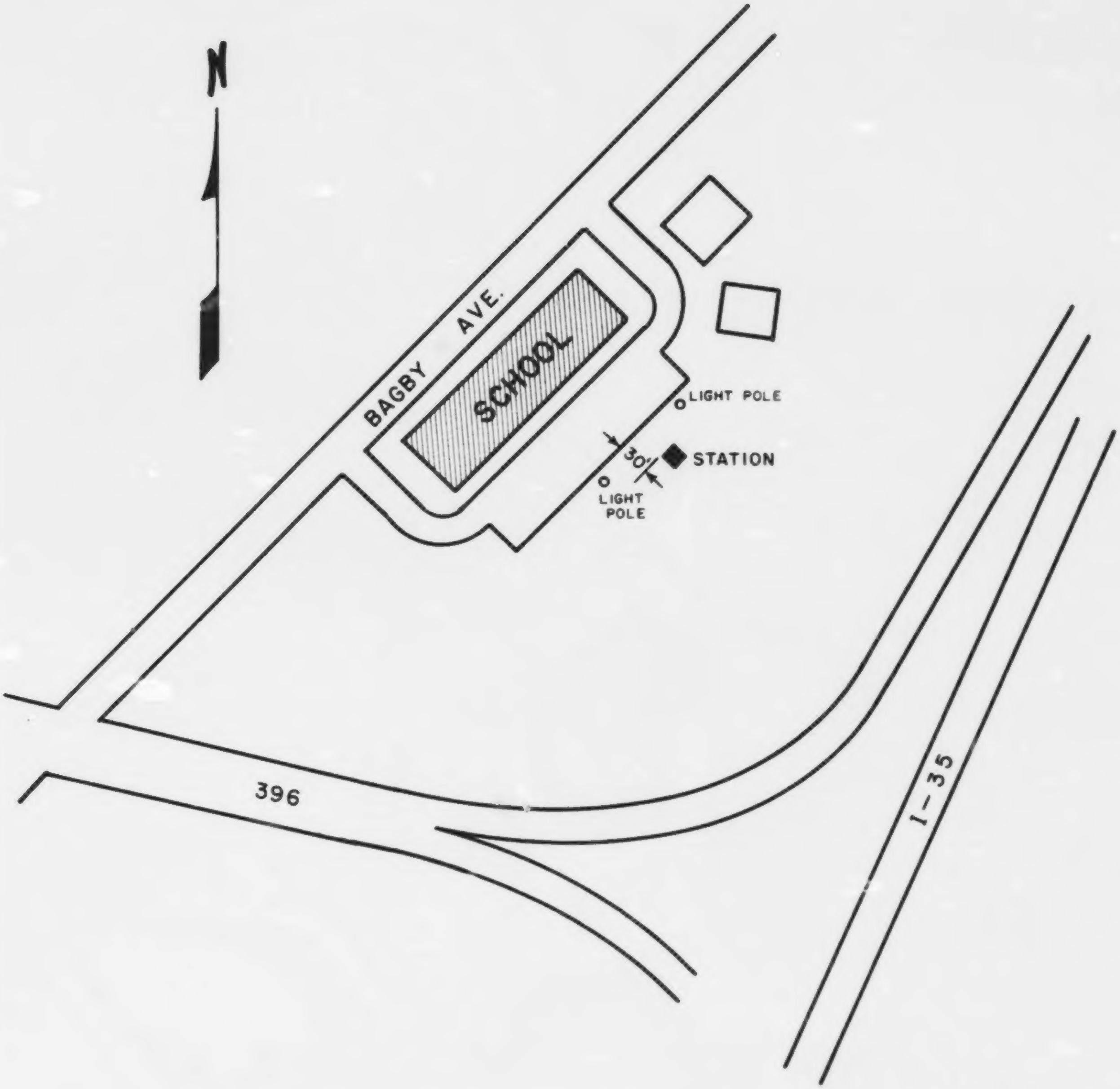


LEGEND

- ▒ LOW DENSITY RESIDENTIAL
- ▩ HIGH DENSITY RESIDENTIAL
- ▨ COMMERCIAL
- ▦ INDUSTRY
- ☐ PUBLIC & SEMI-PUBLIC
- ☐ VACANT
- ① TRAFFIC COUNT SITE
- - - - BUS ROUTE



Aerial photograph of P-4.
Monitoring site is circled.



P-4 UNIVERSITY HIGH SCHOOL

HOURLY "HAND-HELD METER" NOISE DATA AT P-4

DECEMBER 2, 1973

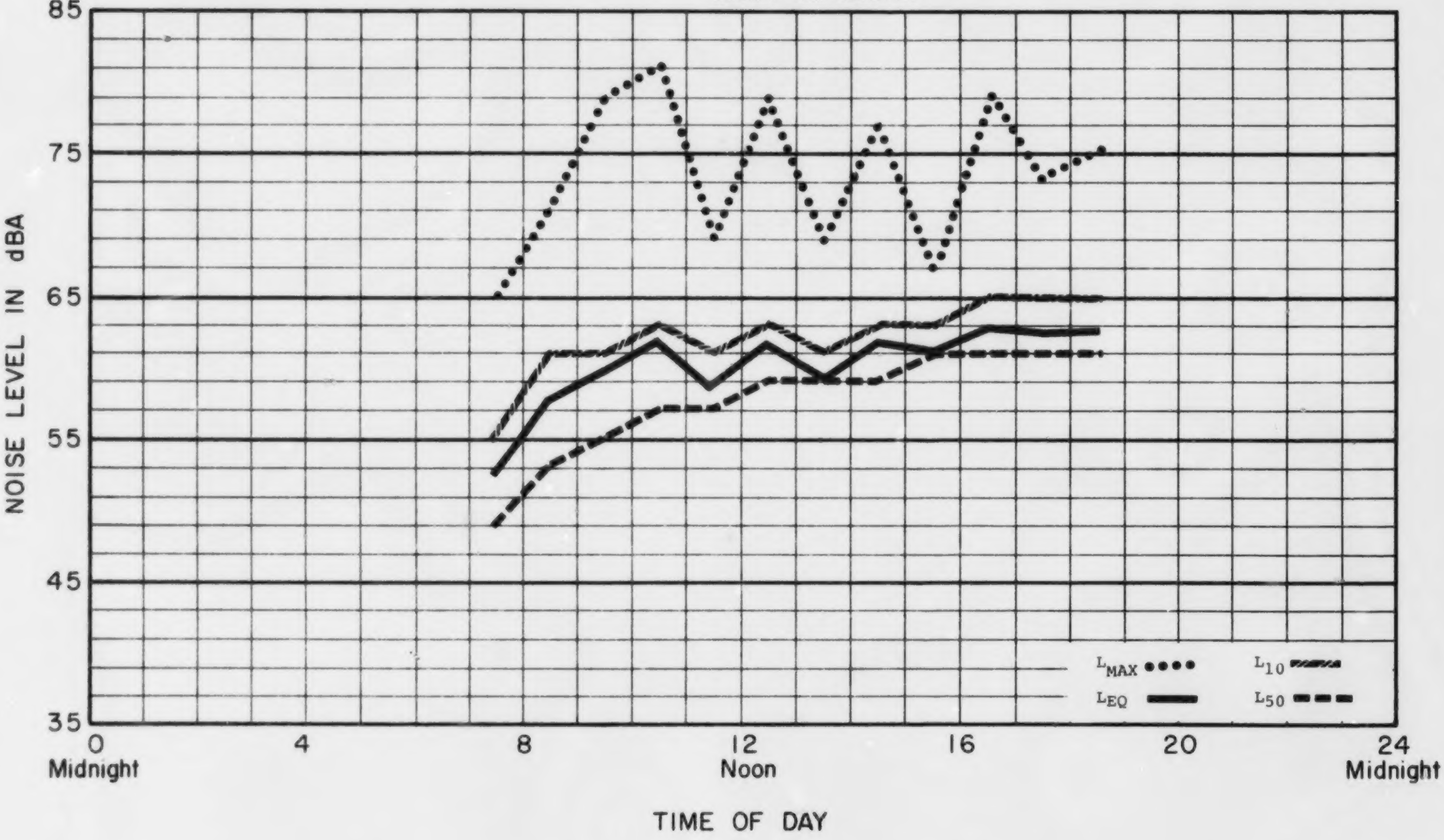
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.00 - 8.00	10	97	55	49	45	65	52.6	63.3	55.0
8.00 - 9.00	9	93	61	53	47	71	57.8	71.4	73.0
9.00 -10.00	12	93	61	55	51	79	59.6	69.3	61.0
10.00-11.00	10	90	63	57	53	81	61.7	72.9	63.0
11.00-12.00	14	84	61	57	53	69	58.6	66.7	55.0
12.00-13.00	15	75	63	59	55	79	61.5	70.4	57.0
13.00-14.00	15	64	61	59	55	69	59.3	66.1	49.0
14.00-14.50	19	57	63	59	57	77	61.6	68.5	51.0
15.00-15.50	17	55	63	61	57	67	61.1	67.0	51.0
16.00-17.00	15	55	65	61	57	79	62.9	71.2	59.0
17.00-18.00	13	59	65	61	59	73	62.4	69.1	53.0
18.00-19.00	14	59	65	61	59	75	62.6	69.9	53.0

SUMMARY OF NOISE LEVELS AT P-4 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 81 L_{10} = 63 L_{50} = 59 L_{90} = 51

L_{EQ} = 60.8 L_{DN} = 60.8 L_{NP} = 73.0   TNI = 69.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-4

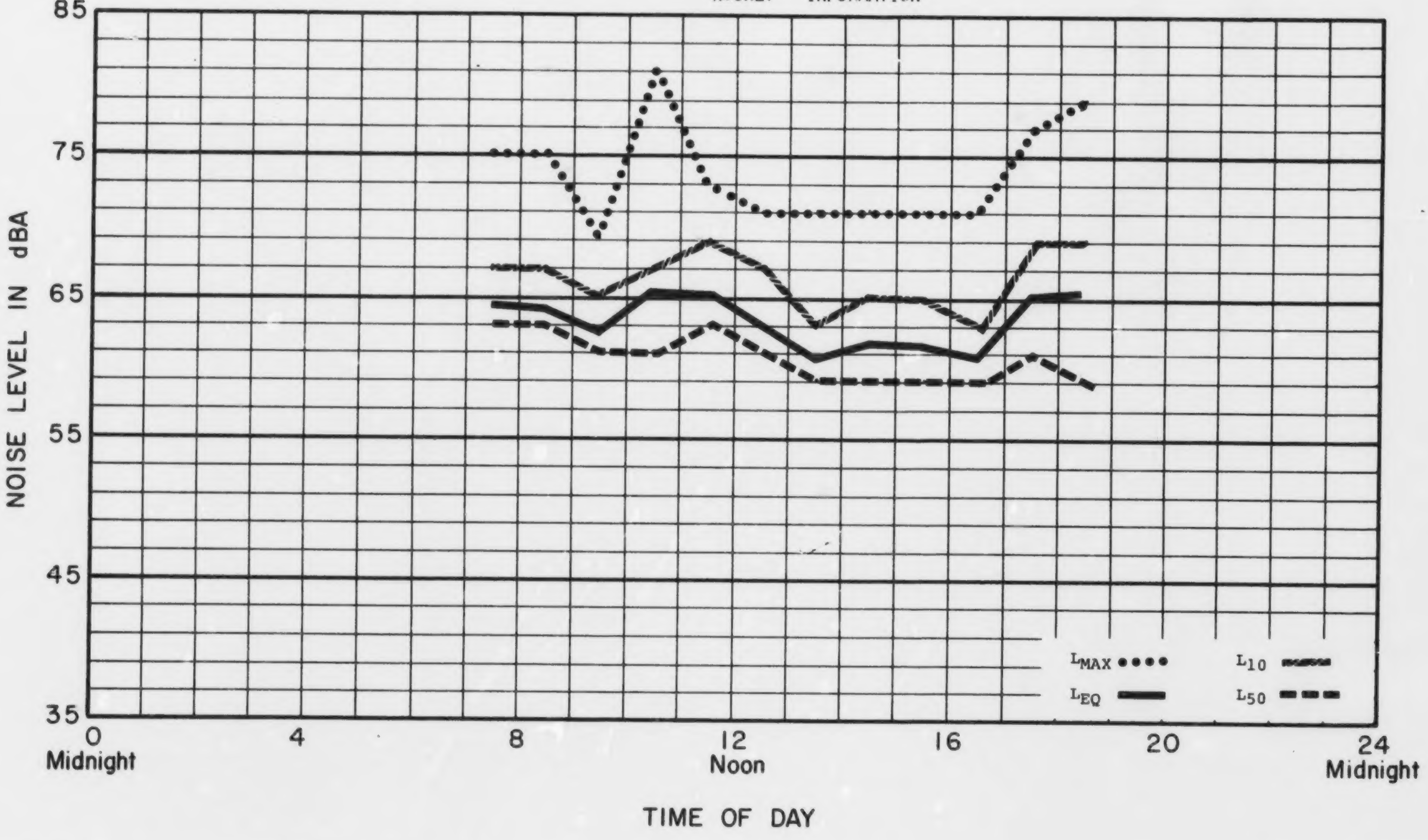
DECEMBER 3, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
7.00 - 8.00	17	87	67	63	59	75	64.5	72.8	61.0
8.00 - 9.00	13	90	67	63	59	75	64.0	71.6	61.0
9.00 -10.00	14	90	65	61	59	69	62.7	70.2	53.0
10.40 -11.00	16	87	67	61	59	81	65.5	74.0	61.0
11.00 -12.00	17	82	69	63	61	73	65.1	72.9	63.0
12.00 -13.00	18	82	67	61	59	71	63.3	71.3	61.0
13.00 -14.00	16	70	63	59	55	71	60.6	69.1	57.0
14.00 -15.00	14	55	65	59	57	71	61.9	70.8	59.0
15.00 -16.00	17	30	65	59	57	71	61.5	69.3	59.0
16.00 -17.00	15	29	63	59	57	71	60.8	68.3	51.0
17.00 -18.00	9	32	69	61	57	77	65.1	76.6	75.0
18.00 -19.00	15	32	69	59	55	79	65.2	79.7	81.0

SUMMARY OF NOISE LEVELS AT P-4 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 81 L_{10} = 67 L_{50} = 61 L_{90} = 57
L_{EQ} = 63.6 L_{DN} = 63.6 L_{NP} = 73.5 TNI = 67.0

HOURLY INFORMATION



P-5 ELM MOTT

Population: not available (outside census tract)

Traffic Count (per day)	Location	1971	1980(est.)
	I-35 North of Waco	19510	36200

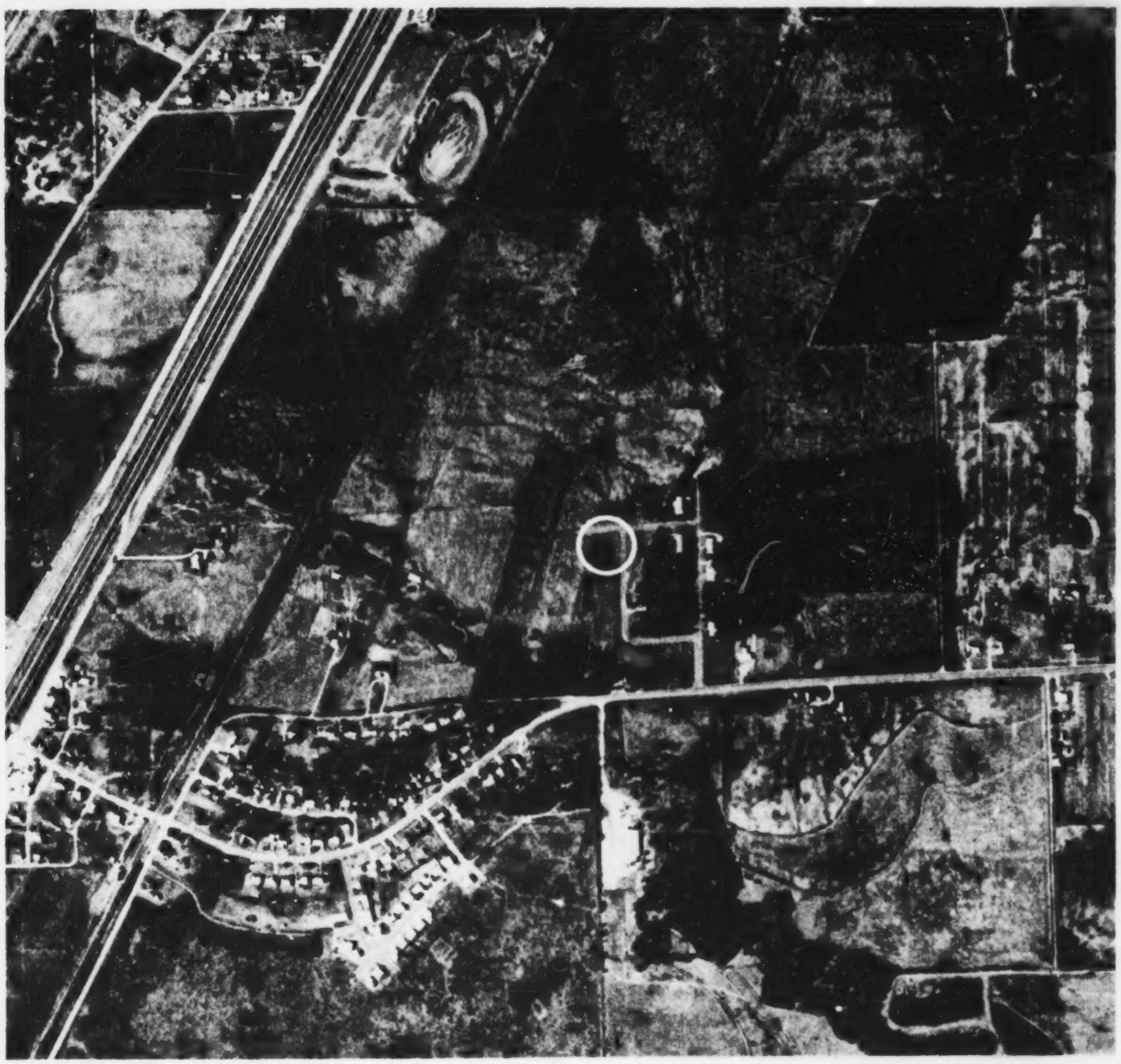
I. Land Use

The land is used in a mixture of farming and cattle grazing.

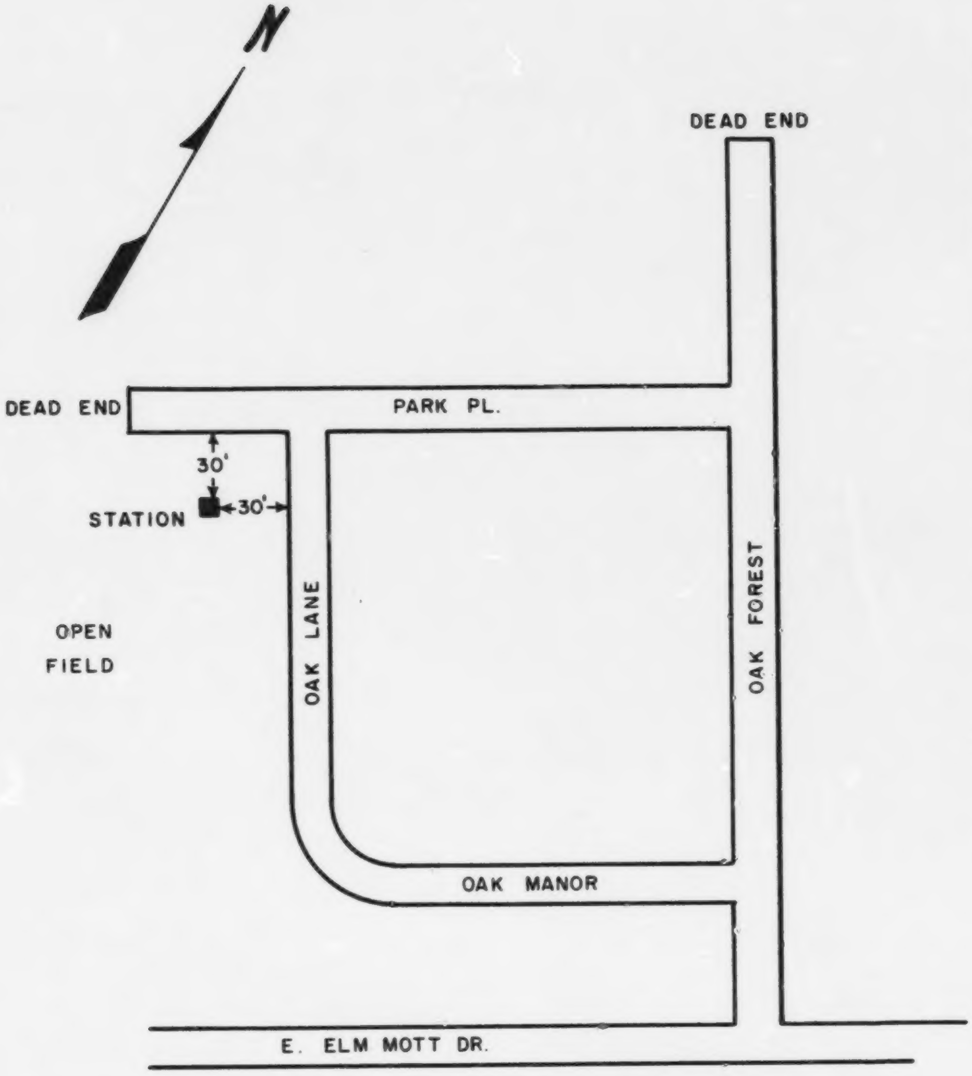
II. Noise Sources

Major: Automobile, truck

Minor: Dogs, birds, insects, railcarrier



Aerial photograph of P-5.
Monitoring site is circled.


N
DEAD END
DEAD END
PARK PL.
30'
STATION
30'
OPEN
FIELD
OAK LANE
OAK FOREST
OAK MANOR
E. ELM MOTT DR.

P-5 ELM MOTT

HOURLY "HAND-HELD METER" NOISE DATA AT P-5

DECEMBER 2, 1973

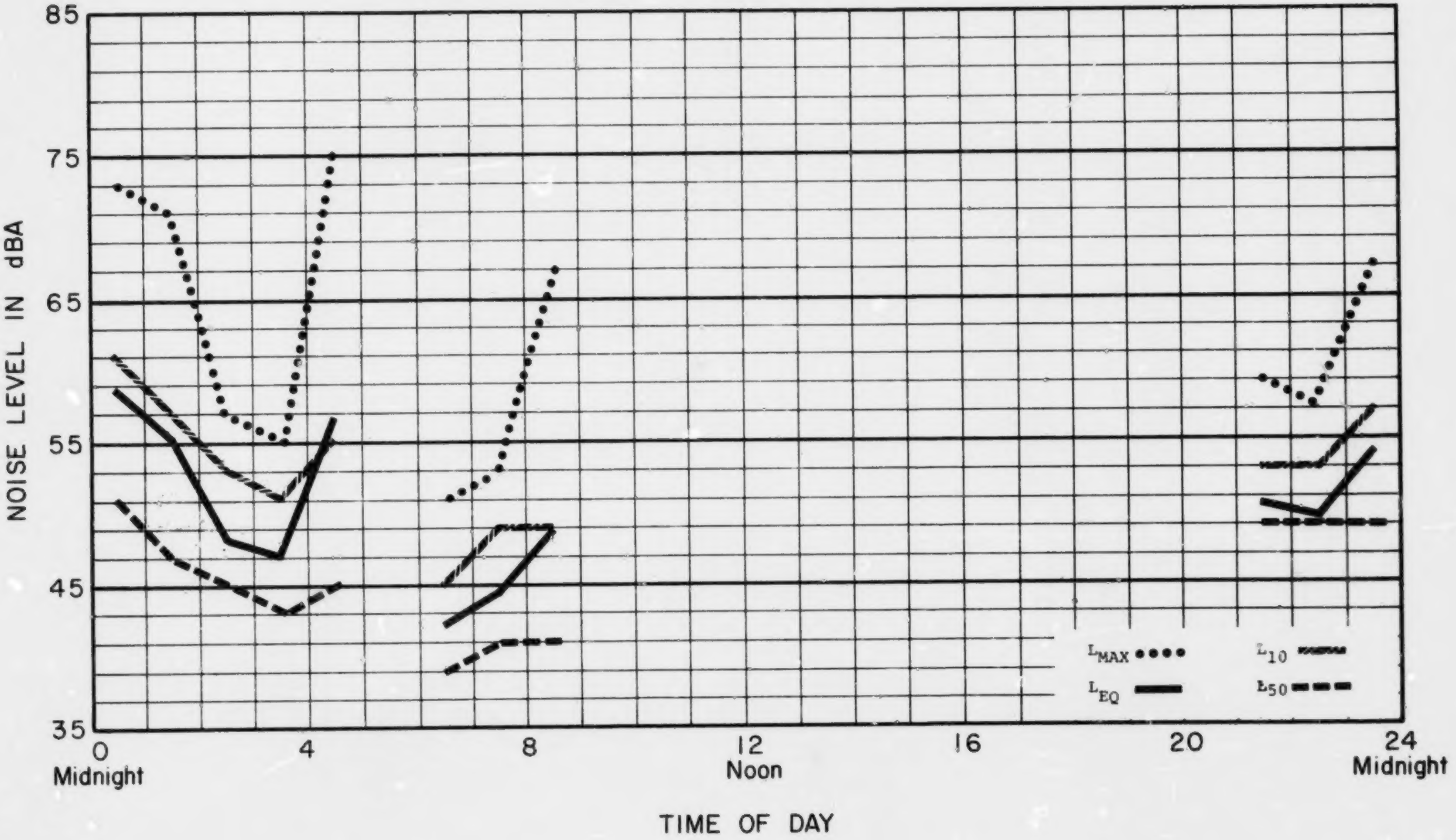
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.15 - 1.00	13	75	61	51	47	73	58.6	73.9	73.0
1.05 - 1.50	14	78	57	47	45	71	55.1	69.1	63.0
2.00 - 2.25	14	83	53	45	41	57	48.2	59.0	59.0
3.30 - 4.00	12	87	51	43	37	55	47.0	60.4	63.0
4.05 - 5.05	12	87	55	45	39	75	56.6	73.5	73.0
6.15 - 7.10	9	93	45	39	35	51	42.1	53.1	45.0
7.15 - 8.00	10	97	49	41	37	53	44.5	55.1	55.0
8.05 - 8.55	9	93	49	41	39	67	48.7	60.2	49.0
21.20-22.00	6	66	53	49	47	59	50.7	57.0	41.0
22.15-23.00	6-20	68	53	49	45	57	49.7	56.8	47.0
23.05-23.50	6-12	84	57	49	45	67	54.0	66.2	63.0

SUMMARY OF NOISE LEVELS AT P-5 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 75 L_{10} = 53 L_{50} = 45 L_{90} = 39

L_{EQ} = 53.6 L_{DN} = 62.5 L_{NP} = 69.6 TNI = 65.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-5

DECEMBER 3, 1973

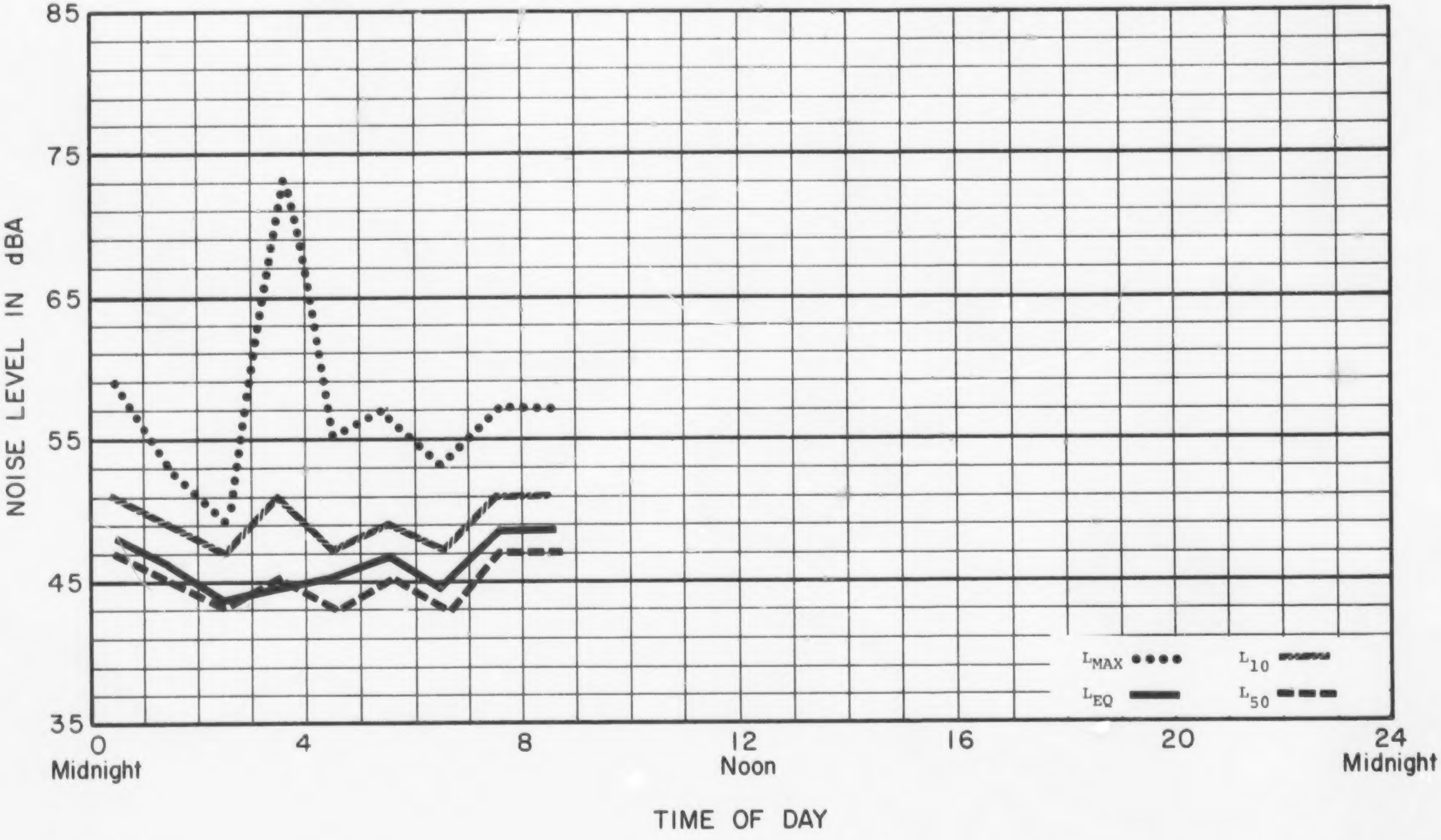
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.01 - 0.50	4-12	88	51	47	43	59	48.0	55.3	45.0
1.00 - 1.50	3-12	89	49	45	43	53	46.2	51.5	37.0
2.40 - 3.05	6-12	89	47	43	41	49	43.7	49.3	35.0
3.15 - 4.00	6-12	89	51	45	43	71	52.0	63.8	45.0
4.10 - 4.55	4-16	93	47	43	41	55	45.2	52.1	35.0
5.05 - 5.55	4-12	95	49	45	43	57	46.9	54.1	37.0
6.10 - 7.00	3-10	95	47	43	41	53	44.7	50.2	35.0
7.05 - 7.55	2-7	95	51	47	43	57	48.3	55.8	45.0
8.00 - 8.30	3-9	95	51	47	45	57	48.6	55.2	39.0

SUMMARY OF NOISE LEVELS AT P-5 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 71 L_{10} = 51 L_{50} = 47 L_{90} = 43

L_{EQ} = 49.4 L_{DN} = 58.3 L_{NP} = 59.0 TNI = 45.0

HOURLY INFORMATION



P-6 LA VAGA SCHOOL

Population (Census Tract #17)	
	1960 - 3729
	1970 - 3239
	1995 - 5499 (est.)

Traffic Count (per day)	Location	1971	1980(est.)
	(1)	--	5390
	(2)	5230	7570

I. Land Use

Census Tract #17 drawing depicts the land use showing the areas of:

- A. Low density residential which is middle and low-middle income dwellings.
- B. High density apartments which are still 1-2 level dwellings.
- C. Small commercial areas - mostly shopping centers.
- D. Industry associated with railroads plus General Tire Plant.
- E. Public, semi-public, mainly schools and small to medium churches.

II. Traffic Count

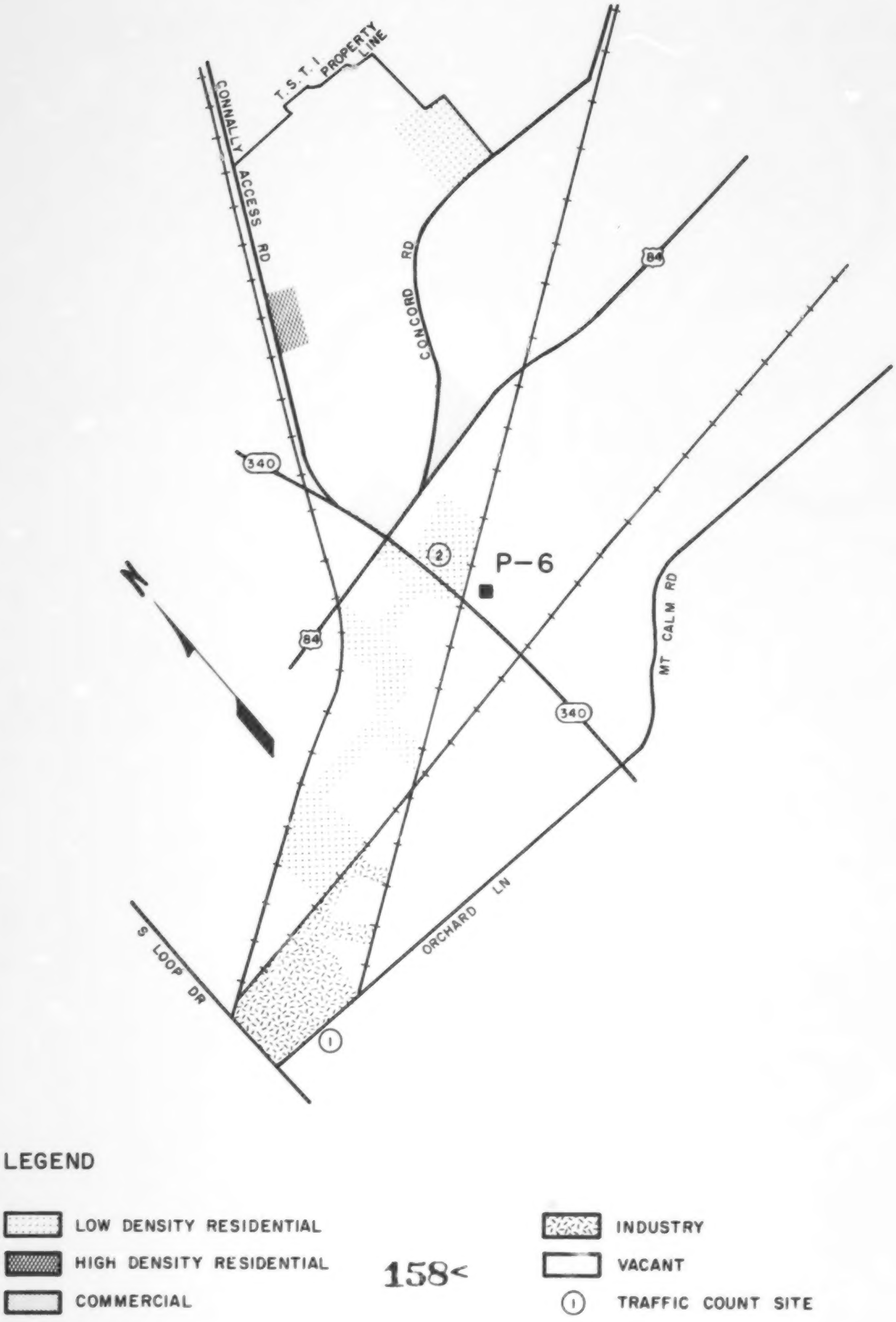
The two sites reflect traffic on the main areteries of this tract. There are no bus lines here - one major train roadbed - the MKT.

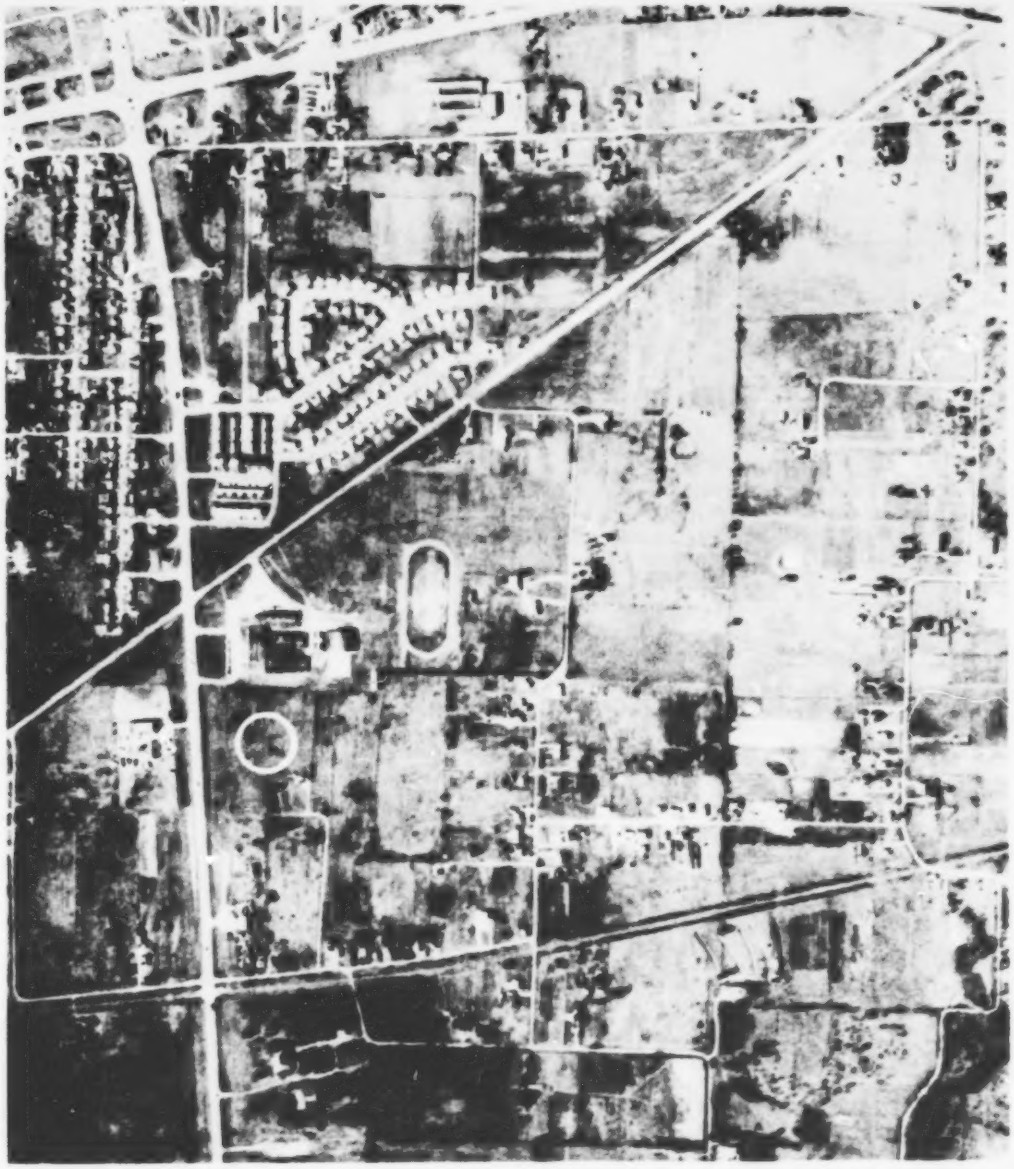
III. Noise Sources

Major: Automobile, motorcycle, railcarrier, truck

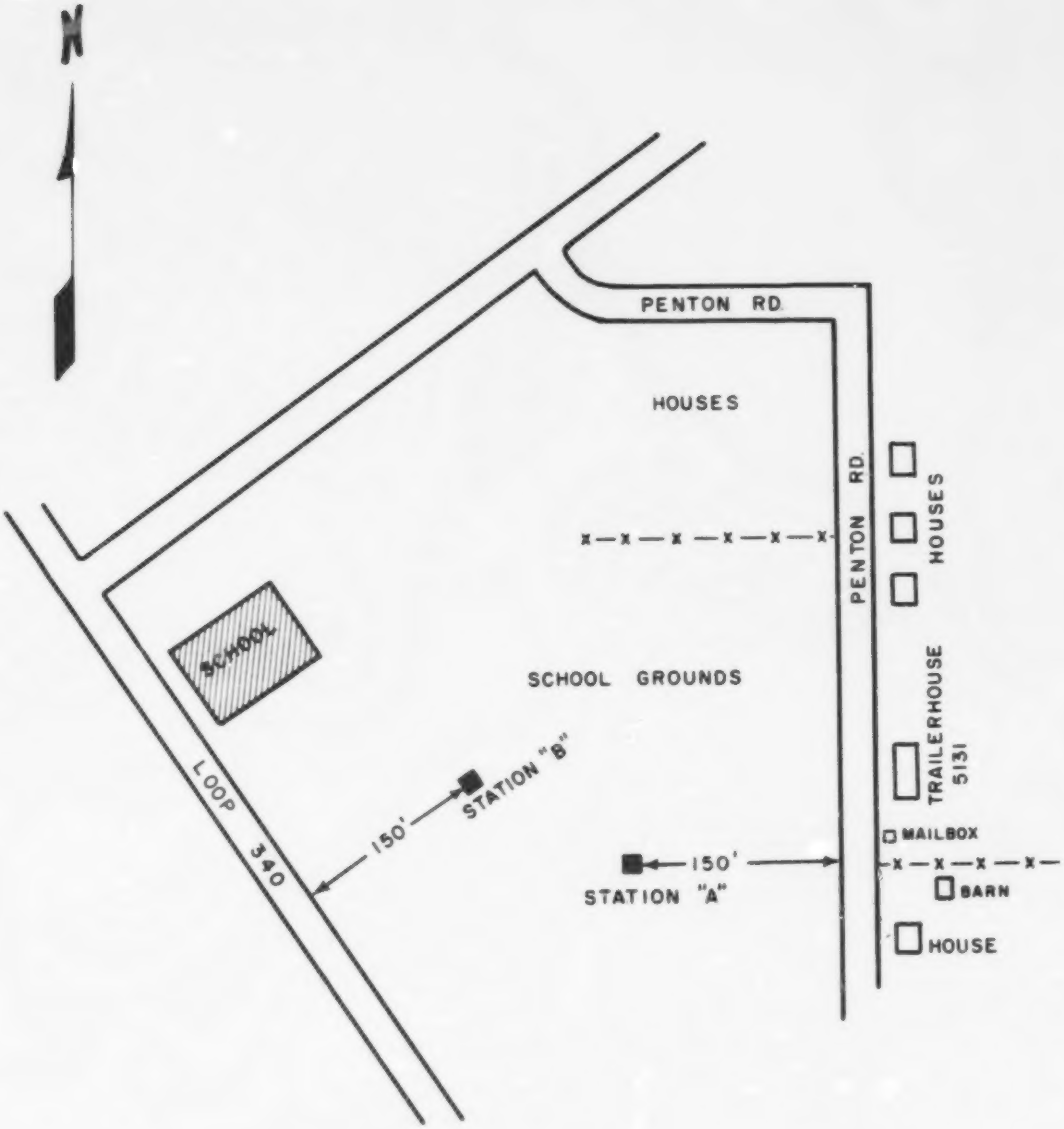
Minor: Truck, industrial, light aircraft, birds, dogs, chickens, railcarrier, Hi-Fi

CENSUS TRACT NO. 17





Aerial photograph of P-6.
Monitoring site is circled.



P-6 LA VAGA INTERMEDIATE SCHOOL

HOURLY "HAND-HELD METER" NOISE DATA AT P-6

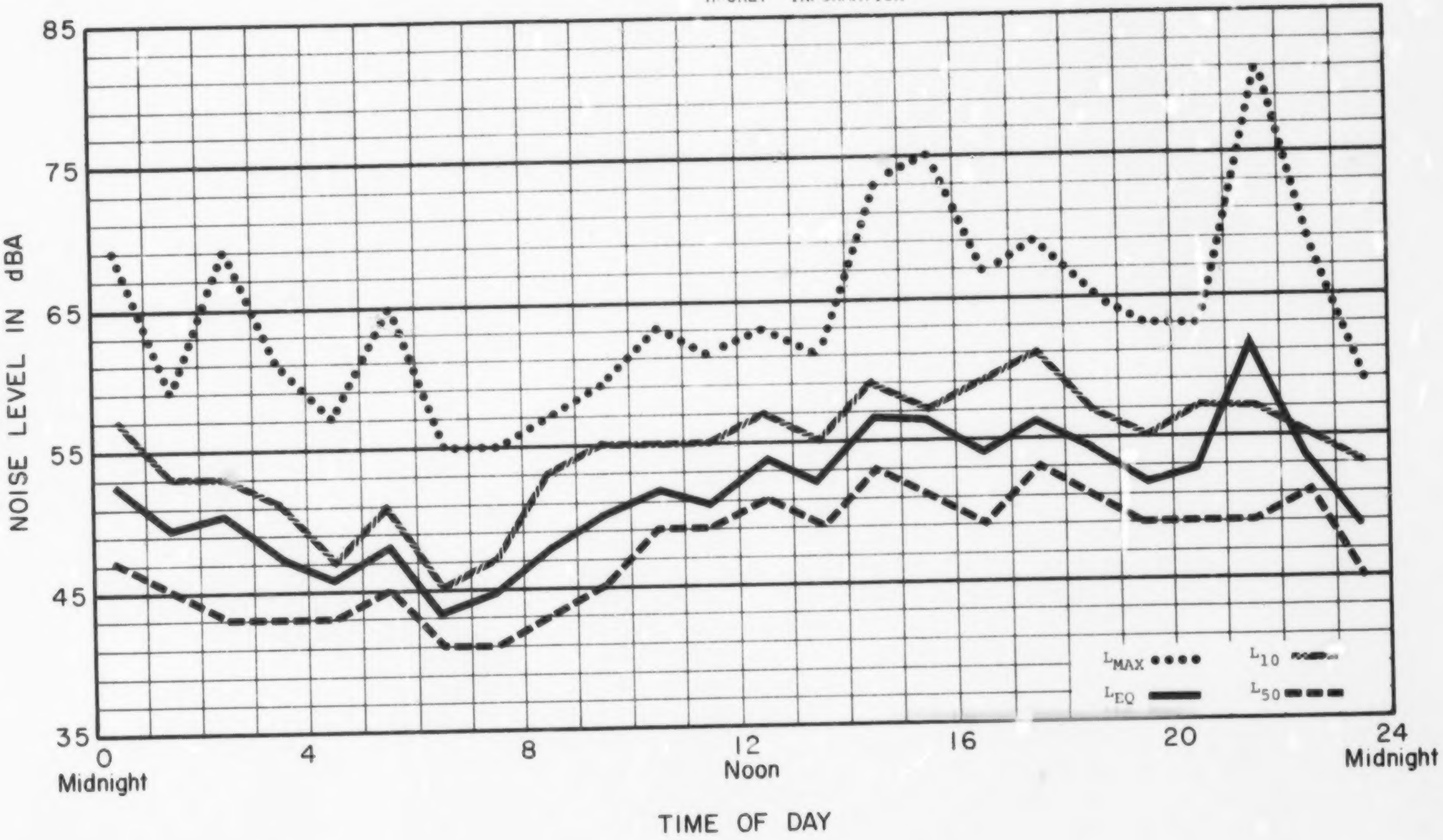
DECEMBER 2, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.05 - 1.05	13	75	57	47	43	69	52.7	66.8	69.0
1.05 - 1.53	14	78	53	45	41	59	49.2	60.9	59.0
2.05 - 3.00	14	83	53	43	41	69	50.5	63.5	59.0
3.00 - 4.00	12	87	51	43	41	61	47.5	58.8	51.0
4.00 - 5.00	12	87	47	43	41	57	45.6	52.2	35.0
5.00 - 5.50	12	90	51	45	43	65	48.0	57.0	45.0
6.00 - 6.50	9	93	45	41	39	55	43.0	49.2	33.0
6.58 - 7.45	10	97	47	41	41	55	44.9	53.5	35.0
8.00 - 9.00	9	93	53	43	39	57	47.8	60.0	65.0
9.00 - 9.50	12	93	55	45	39	59	50.0	64.4	73.0
10.00 -11.00	10	90	55	49	43	63	51.8	64.0	61.0
11.00 -12.00	14	84	55	49	43	61	50.8	61.1	61.0
12.00 -13.00	15	75	57	51	45	63	53.7	65.3	63.0
13.00 -14.00	15	64	55	49	43	61	52.2	64.2	61.0
14.00 -15.00	19	57	59	53	47	73	56.8	69.3	65.0
15.00 -15.50	17	55	57	51	45	75	56.4	69.2	63.0
16.00 -17.00	15	55	59	49	45	67	54.0	66.9	71.0
17.00 -18.00	13	59	61	53	47	69	56.2	69.0	73.0
18.00 -19.00	14	59	57	51	45	65	54.2	66.7	63.0
19.00 -20.00	17	61	55	49	45	63	51.9	63.3	55.0
20.00 -21.00	21	70	57	49	45	63	52.7	64.7	63.0
21.00 -22.00	20	70	57	49	45	79	61.5	76.4	63.0
22.00 -23.00	21	75	55	51	47	69	53.2	63.1	49.0
23.00 -24.00	15	81	53	45	41	59	48.7	59.9	59.0

SUMMARY OF NOISE LEVELS AT P-6 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 79 L_{10} = 55 L_{50} = 47 L_{90} = 41
L_{EQ} = 53.5 L_{DN} = 57.3 L_{NP} = 67.7 TNI = 67.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-6

DECEMBER 3, 1973

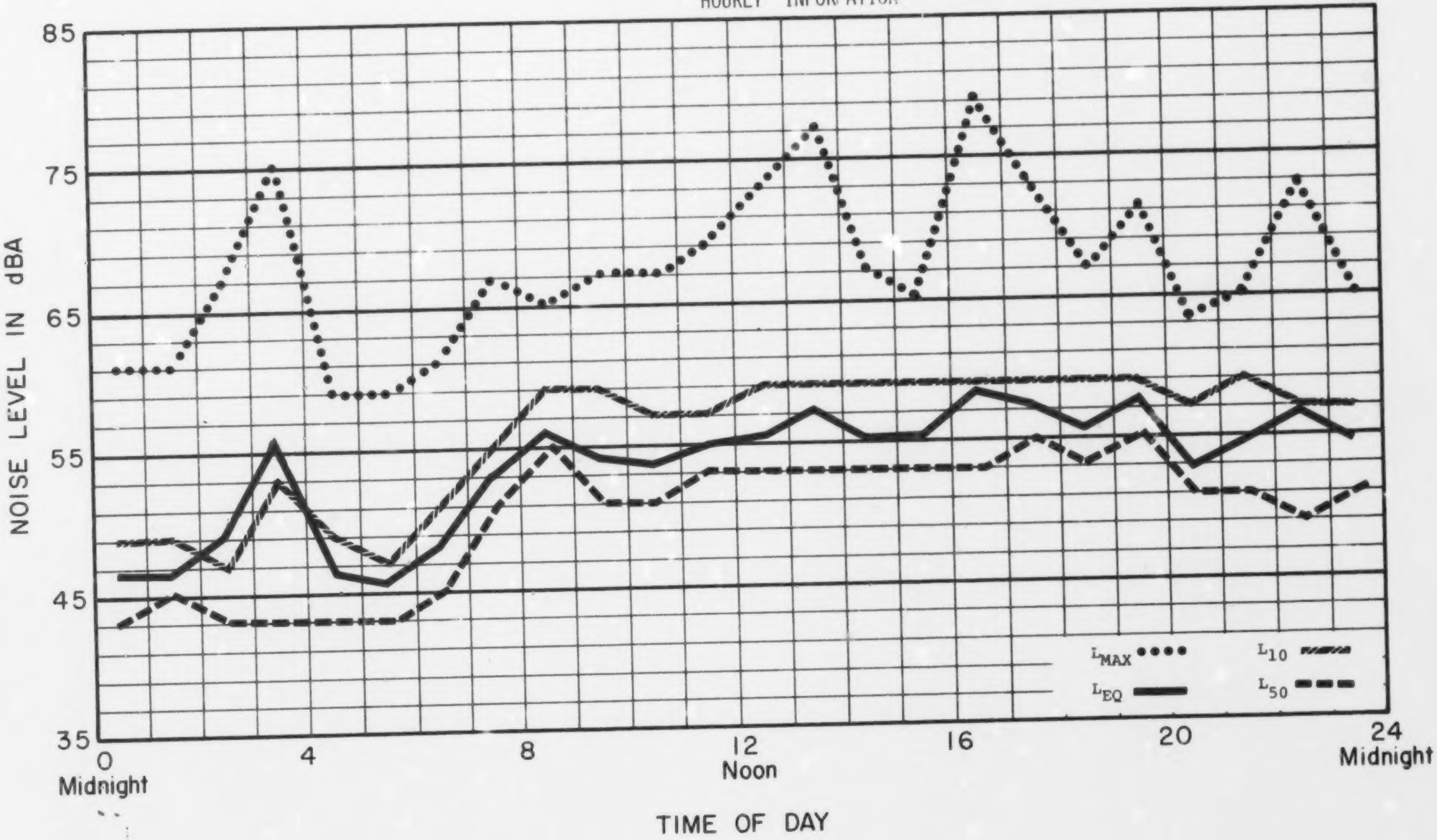
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.00 - 1.00	15	81	29	43	41	61	46.7	55.7	43.0
1.00 - 2.00	17	84	49	45	41	61	46.3	53.9	43.0
2.00 - 3.00	20	87	47	43	41	67	49.1	58.0	35.0
3.00 - 4.00	20	90	53	43	41	75	55.6	70.8	59.0
4.00 - 5.00	20	90	49	43	41	59	46.3	54.3	43.0
5.00 - 6.00	20	90	47	43	41	59	45.8	53.1	35.0
6.00 - 7.00	19	90	51	45	43	61	48.3	56.7	45.0
7.00 - 7.45	17	87	55	51	45	67	53.1	64.5	55.0
8.00 - 9.00	13	90	59	55	51	65	56.0	64.9	53.0
9.00 -10.00	14	90	59	51	47	67	54.1	64.8	65.0
10.00-11.00	16	87	57	51	47	67	53.8	63.9	57.0
11.00-12.00	17	82	57	53	47	69	55.0	65.5	57.0
12.00-13.00	18	82	59	53	49	63	55.5	65.7	59.0
13.00-14.00	16	70	59	53	49	77	57.3	68.0	59.0
14.00-15.00	14	55	59	53	49	67	55.1	65.1	59.0
15.00-15.50	17	30	59	53	49	65	55.2	64.2	59.0
16.00-16.50	15	29	59	53	49	79	58.6	69.7	59.0
17.00-18.00	9	32	59	55	51	73	57.3	66.8	53.0
18.00-19.00	15	32	59	53	49	67	55.8	65.9	59.0
19.00-20.00	10	29	59	55	47	71	57.4	69.9	65.0
20.00-21.00	14	27	57	51	45	63	52.9	63.4	63.0
21.00-22.00	10	35	59	51	45	65	54.5	67.6	71.0
22.00-23.00	9	40	57	49	45	73	56.4	70.7	63.0
23.00-24.00	17	40	57	51	47	65	54.5	66.5	57.0

SUMMARY OF NOISE LEVELS AT P-6 FOR DECEMBER 3, 1973

DAILY INFORMATION: L_{MAX} = 79 L_{10} = 57 L_{50} = 51 L_{90} = 43

L_{EQ} = 54.7 L_{DN} = 59.0 L_{NP} = 69.0 TNI = 69.0

HOURLY INFORMATION



P-7 HILLCREST ELEMENTARY SCHOOL

Population (Census Tract #26)	1960 - 4031 1970 - 7087 1995 - 9250 (est.)

Traffic Counts (per day)	Location	1971	1980(est.)
	(1)	7530	8530
	(2)	3900	5840
	(3)	3250	5030

I. Land Use

Census Tract #26 drawing depicts land use showing areas of:

A. Low density residential dwellings which comprise most of the area surrounding sites. Units are upper middle-class and higher.

B. The high density residential dwellings include one high level condiminium apartment building and a number of high-cost,2-level apartment complexes.

C. The commercial areas represent large shopping centers.

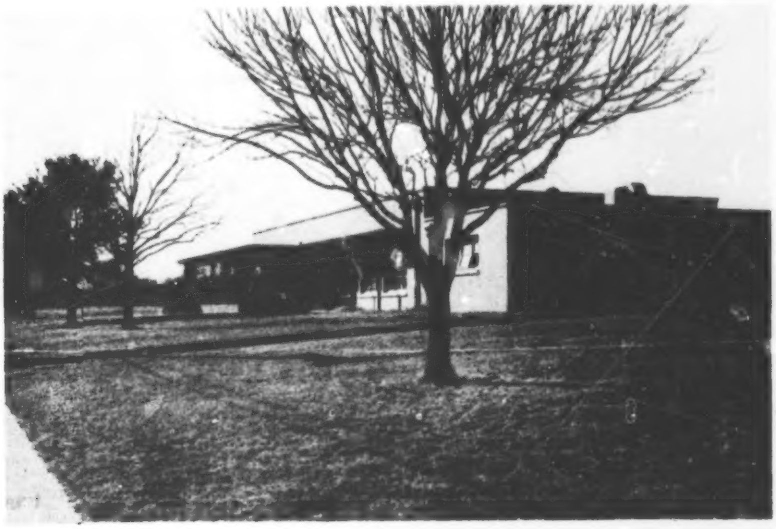
D. The public and semi-public sections are primarily schools and churches.

II. Traffic

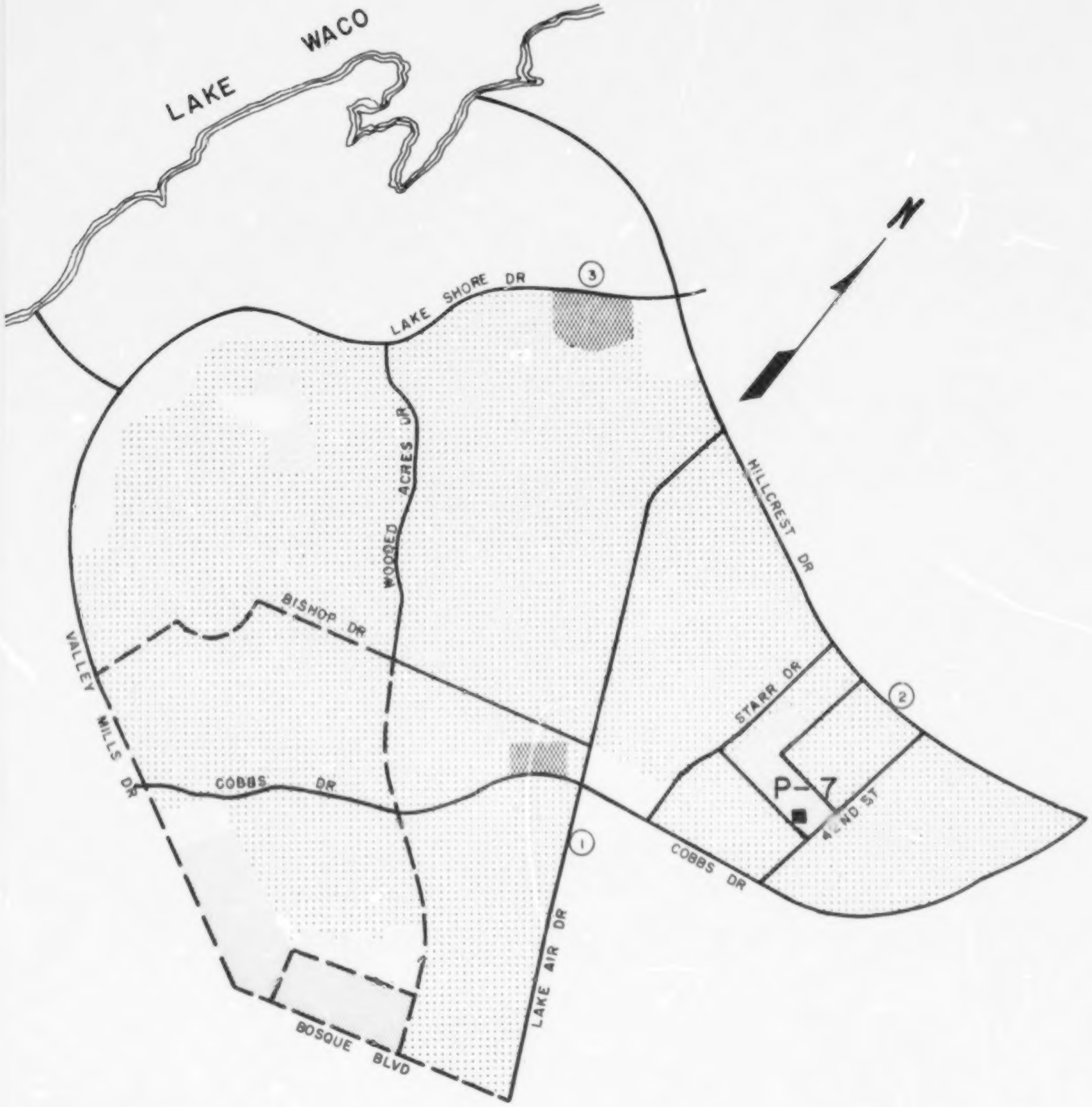
The traffic count sites shown as well as the city bus routes.

III. Noise Sources

Major: Automobile, bus, motorcycle, children, lawnmowers
Minor: Motorcycle, birds, dogs, truck, light aircraft



CENSUS TRACT NO. 26



LEGEND

░ LOW DENSITY RESIDENTIAL

▨ HIGH DENSITY RESIDENTIAL

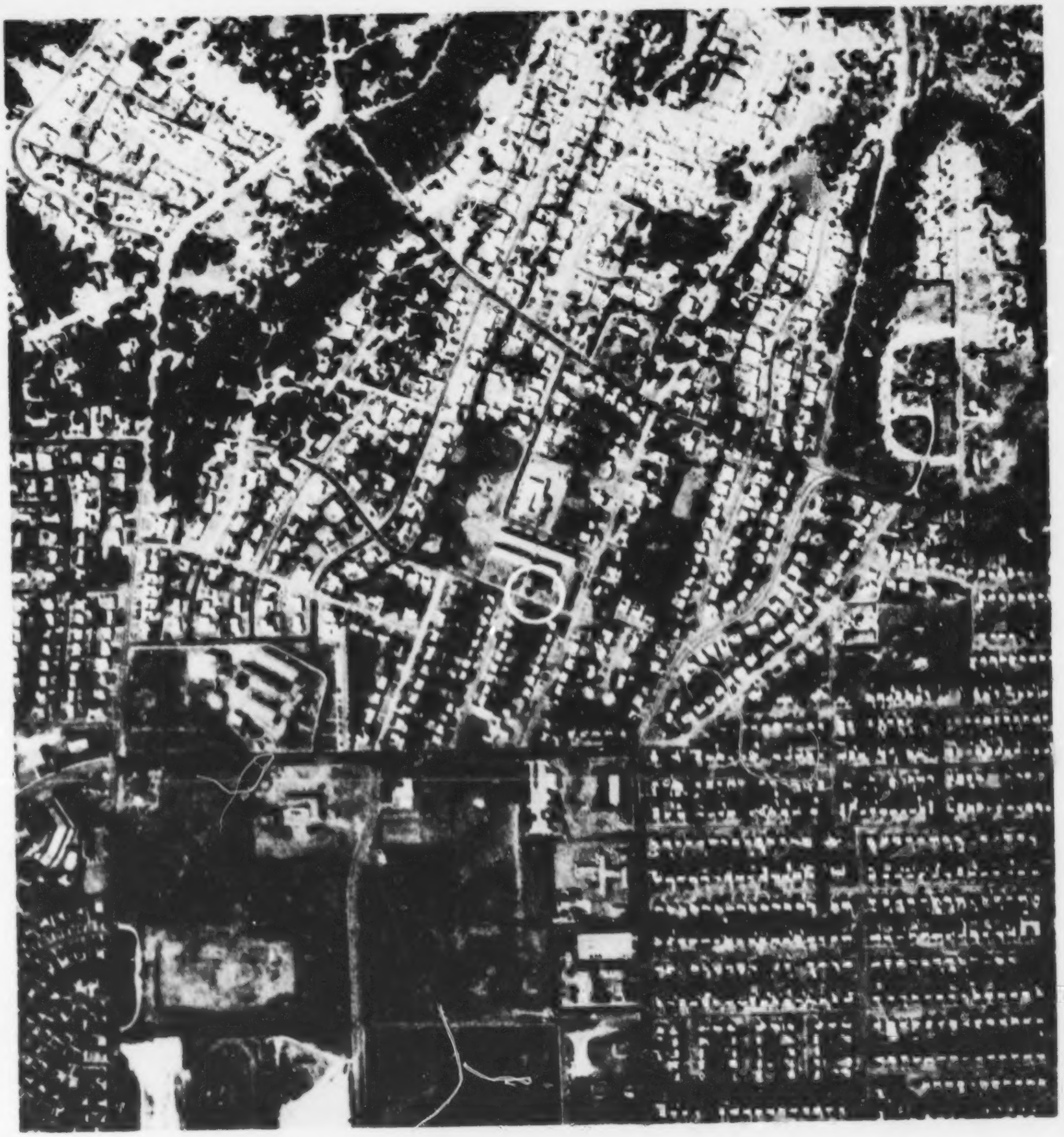
☐ COMMERCIAL

☐ PUBLIC & SEMI-PUBLIC

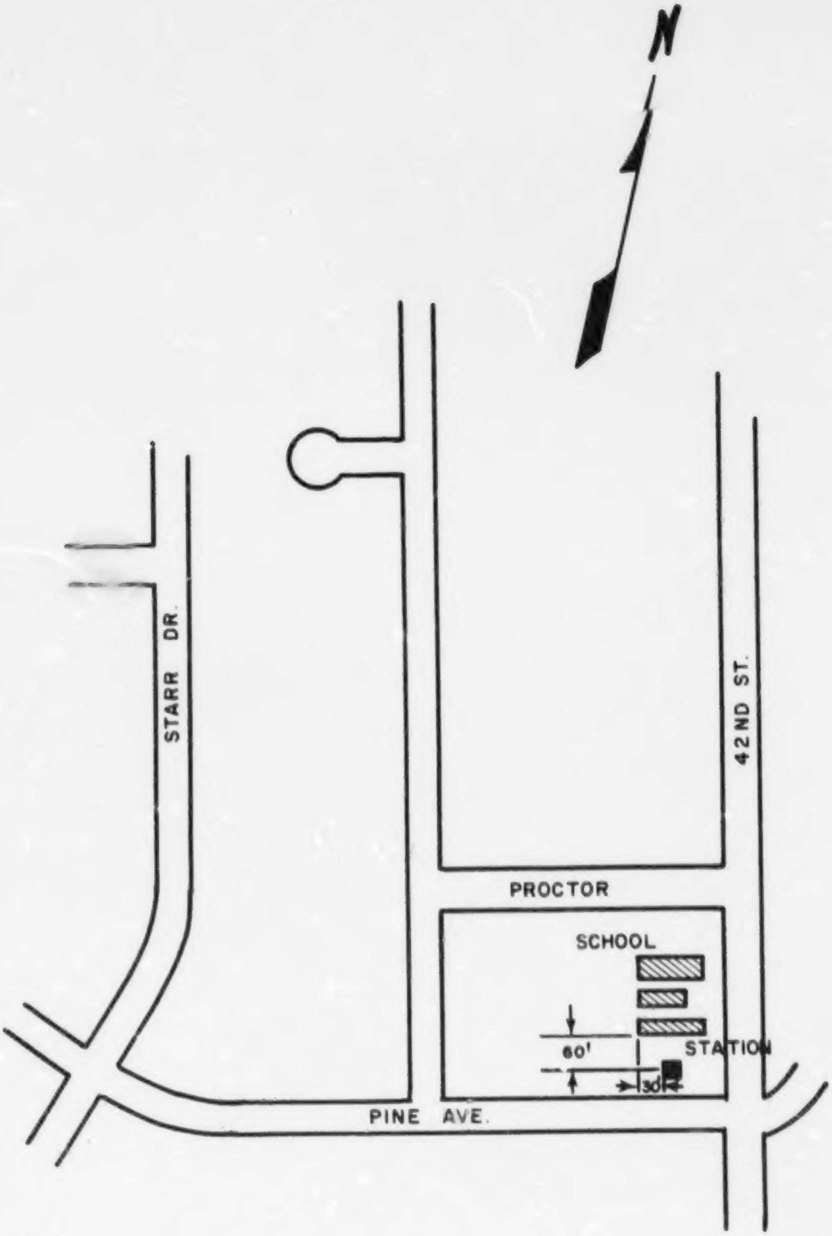
☐ VACANT

① TRAFFIC COUNT SITE

▭ BUS ROUTE



Aerial photograph of P-7.
Monitoring site is circled.



P-7 HILLCREST ELEMENTARY SCHOOL

HOURLY "HAND-HELD METER" NOISE DATA AT P-7

DECEMBER 2, 1973

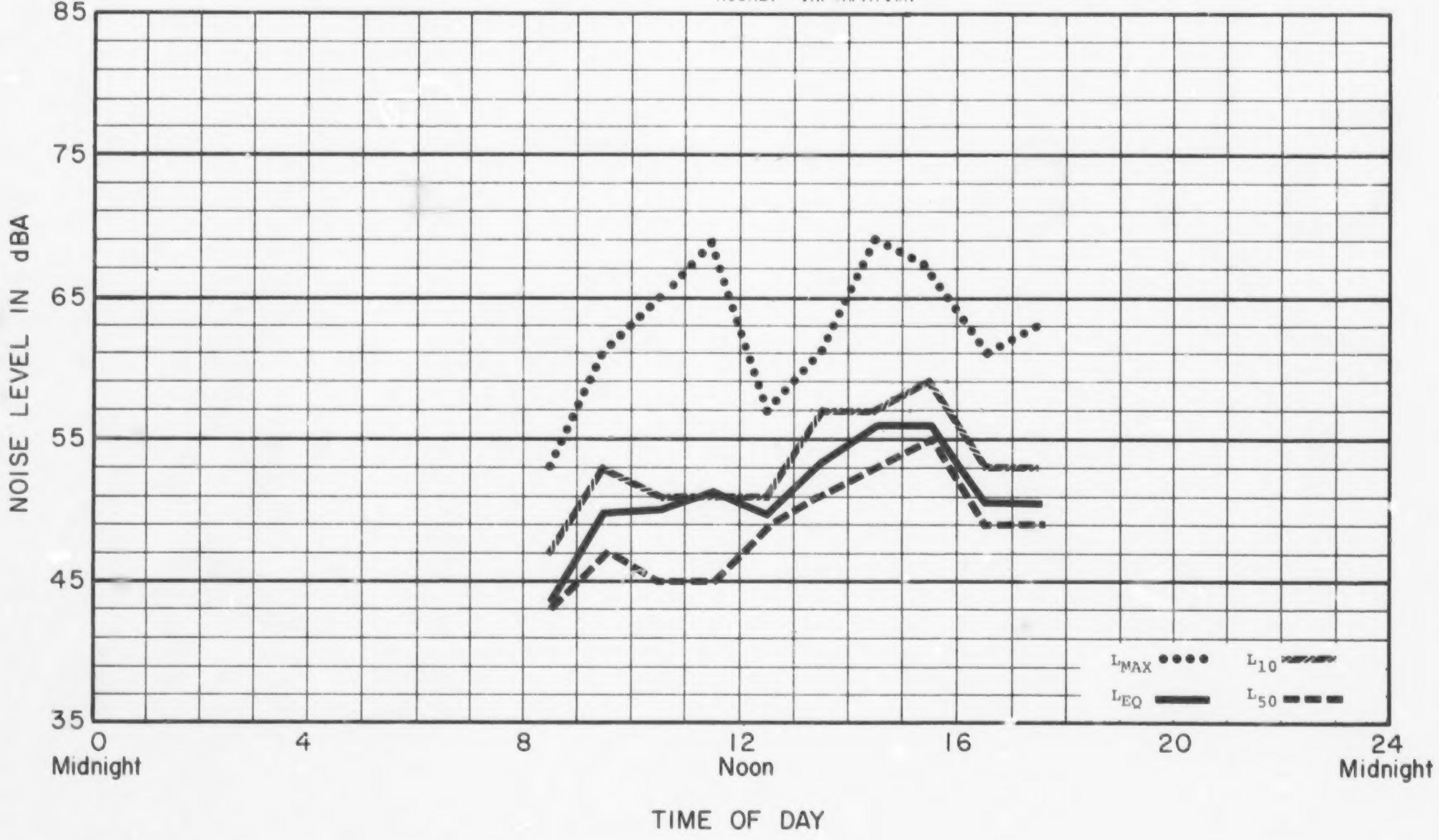
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 9.00	9	93	47	43	39	53	43.6	51.2	41.0
9.00 -10.00	12	93	53	47	45	61	49.8	57.6	47.0
10.00 -11.00	10	90	51	45	43	65	50.3	60.9	45.0
11.00 -12.00	14	84	51	45	43	69	51.2	63.1	45.0
12.00 -13.00	15	75	51	49	45	57	49.6	56.5	39.0
13.00 -13.50	15	64	57	51	49	61	53.5	62.5	51.0
14.00 -15.00	19	57	57	53	49	69	55.8	65.5	51.0
15.00 -16.00	17	55	59	55	47	67	56.0	67.0	65.0
16.00 -17.00	15	55	53	49	47	61	50.7	58.3	41.0
17.00 -18.00	13	59	53	49	47	63	50.6	58.0	41.0

SUMMARY OF NOISE LEVELS AT P-7 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 69 L_{10} = 55 L_{50} = 49 L_{90} = 43

L_{EQ} = 52.5 L_{DN} = 54.1 L_{NP} = 64.9   TNI = 61.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-7

DECEMBER 3, 1973

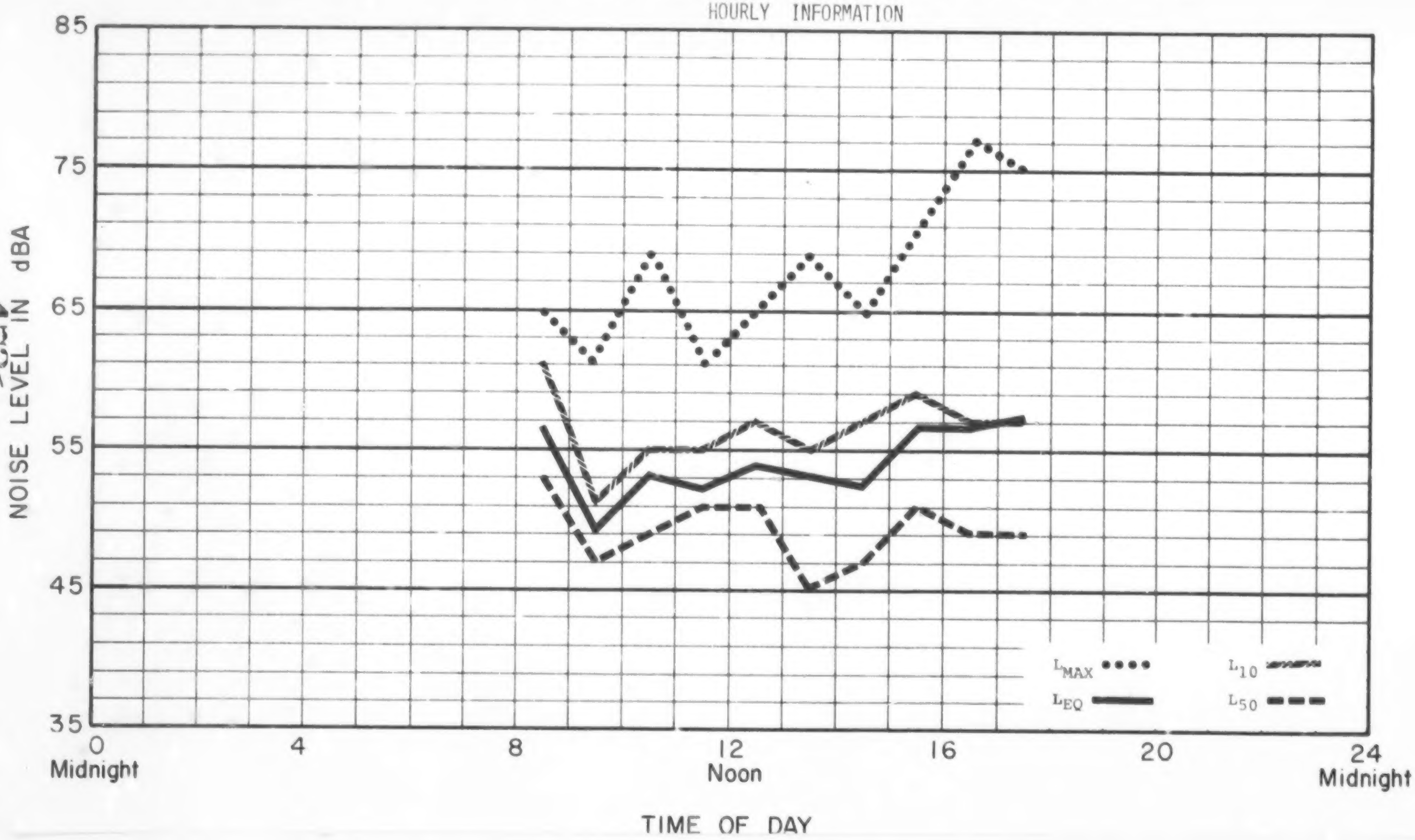
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
8.00 - 8.50	13	90	61	53	47	65	56.5	69.6	73.0
9.00 -10.00	14	90	51	47	45	61	49.1	57.9	39.0
10.00 -11.00	16	87	55	49	47	69	53.4	62.6	49.0
11.00 -12.00	17	82	55	51	47	61	52.4	60.6	49.0
12.00 -13.00	18	82	57	51	47	65	53.9	64.3	57.0
13.00 -14.00	16	70	55	45	43	69	53.2	67.5	61.0
14.00 -15.00	14	55	57	47	43	65	52.5	66.3	69.0
15.00 -16.00	17	30	59	51	45	71	56.5	70.9	71.0
16.00 -17.00	15	29	57	49	45	77	56.4	69.7	63.0
17.00 -18.00	9	32	57	49	45	75	57.3	70.6	63.0

SUMMARY OF NOISE LEVELS AT P-7 FOR DECEMRER 3, 1973

DAILY INFORMATION: L_{MAX} = 77 L_{10} = 57 L_{50} = 49 L_{90} = 45

L_{EQ} = 54.8 L_{DN} = 54.8 L_{NP} = 68.0 TNI = 63.0

HOURLY INFORMATION



P-8 WACO MUNICIPAL AIRPORT

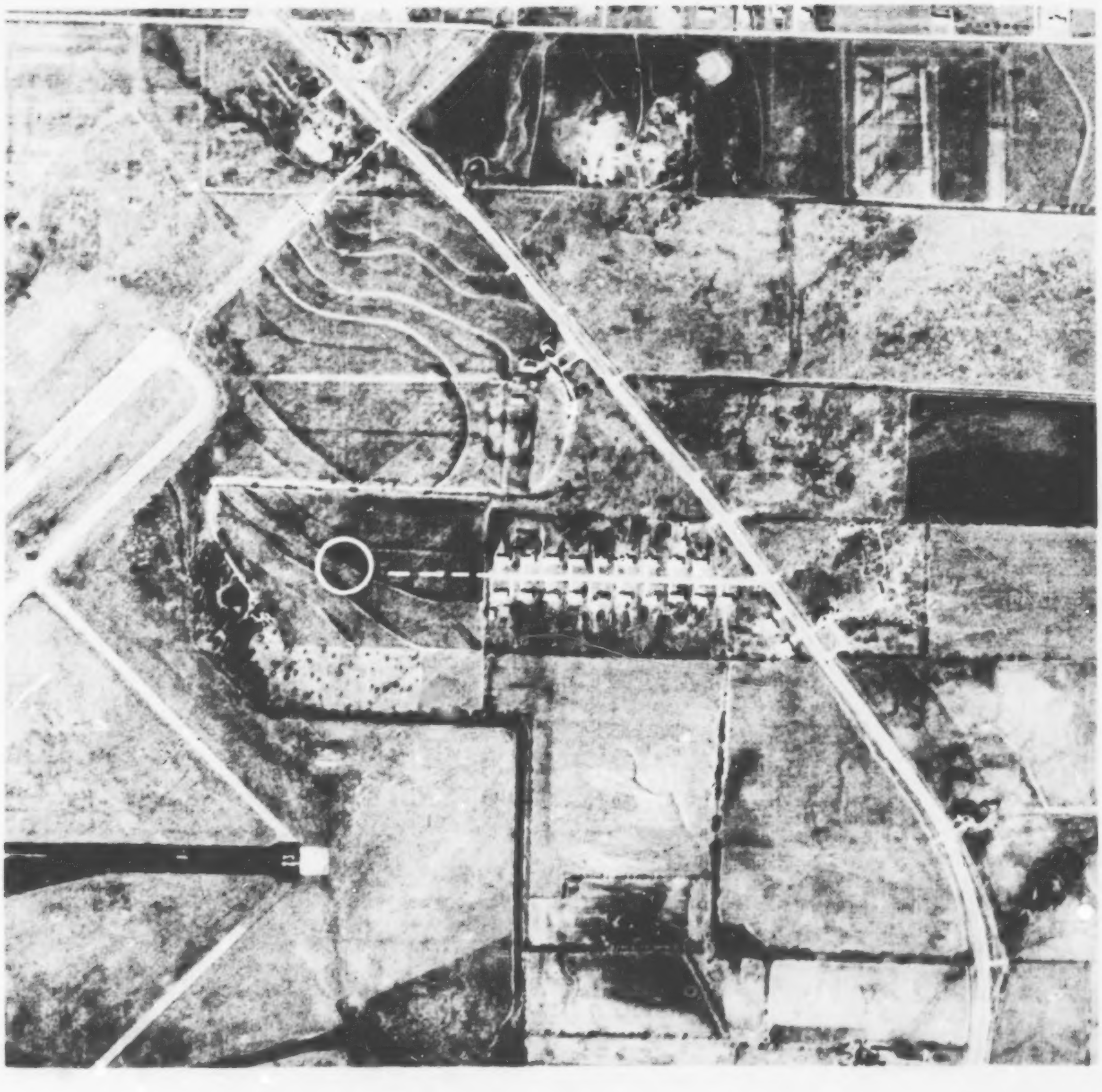
Population: very sparsely grouped middle income dwellings on small farms and local country clubs (outside census tract)

Traffic Count (per day)	Location	1971	1980(est.)
	China Springs Road (1637)	2490	3700

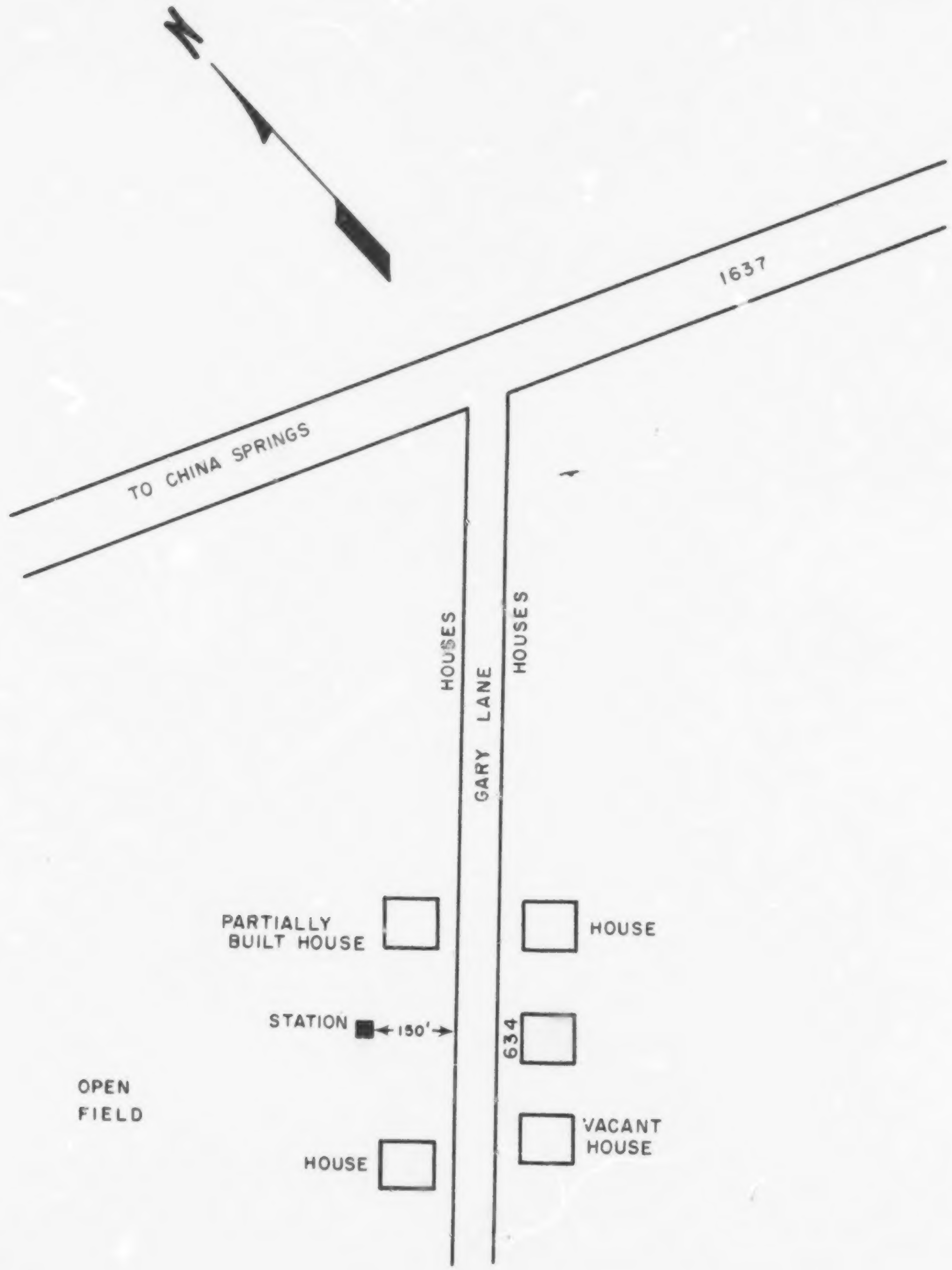
Noise Sources

Major: Light and large aircraft, motorcycle, lawnmower, residents, power line, automobile, construction

Minor: Dogs, residents, light aircraft, automobile



Aerial photograph of P-8.
Monitoring site is circled.
(Dashed line shows recent
extension of road)



P-8 WACO MUNICIPAL AIRPORT

HOURLY "HAND-HELD METER" NOISE DATA AT P-8

DECEMBER 2, 1973

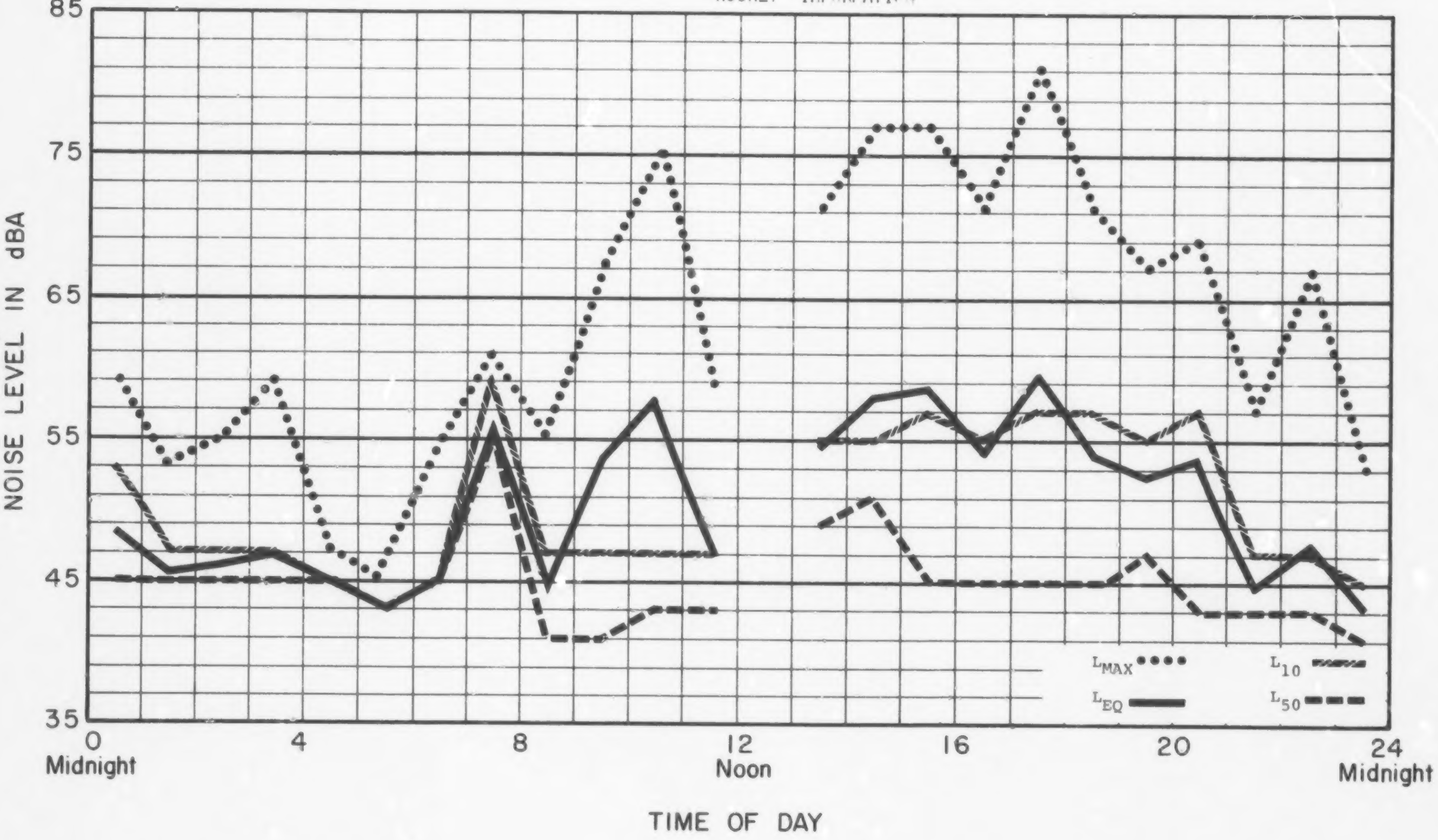
TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
0.10 - 1.00	13	75	53	45	45	59	48.6	56.7	47.0
1.10 - 2.00	14	78	47	45	45	53	45.5	48.4	23.0
2.10 - 3.00	14	83	47	45	45	55	46.3	50.8	23.0
3.10 - 4.00	12	87	47	45	45	59	46.8	52.3	23.0
4.10 - 4.55	12	87	45	45	45	47	45.1	45.9	15.0
5.00 - 5.55	12	90	43	43	43	45	43.0	43.4	13.0
5.50 - 6.35	9	93	45	45	45	55	45.4	48.1	15.0
6.45 - 7.30	10	97	59	55	45	61	56.0	70.5	71.0
8.00 - 8.45	9	93	47	41	41	55	44.3	51.6	35.0
8.55 - 9.45	12	93	47	41	41	67	53.7	69.6	35.0
9.50 -10.45	10	90	53	43	41	75	57.7	74.9	59.0
10.50 -11.40	14	84	51	43	41	59	46.9	57.0	51.0
12.40 -13.40	15	64	55	49	43	71	54.7	68.3	61.0
13.40 -14.40	19	57	55	51	45	77	58.3	72.2	55.0
14.40 -15.40	17	55	57	45	41	77	58.6	77.0	75.0
15.40 -16.40	15	55	55	45	41	71	54.0	69.9	67.0
16.40 -17.40	13	59	57	45	41	81	59.4	76.9	75.0
18.20 -19.20	14	59	57	45	41	71	53.8	70.3	75.0
19.20 -20.20	17	61	55	47	43	67	52.4	65.1	61.0
20.20 -21.20	21	70	57	43	41	69	53.7	70.7	75.0
21.20 -22.20	20	70	47	43	41	57	44.7	51.8	35.0
22.20 -23.20	21	75	47	43	41	67	47.7	57.3	35.0
23.20 -24.20	15	81	45	41	39	53	43.2	49.4	33.0

SUMMARY OF NOISE LEVELS AT P-8 FOR DECEMBER 2, 1973

DAILY INFORMATION: L_{MAX} = 81 L_{10} = 55 L_{50} = 45 L_{90} = 41

L_{EQ} = 53.7 L_{DN} = 55.8 L_{NP} = 67.8 TNI = 67.0

HOURLY INFORMATION



HOURLY "HAND-HELD METER" NOISE DATA AT P-8

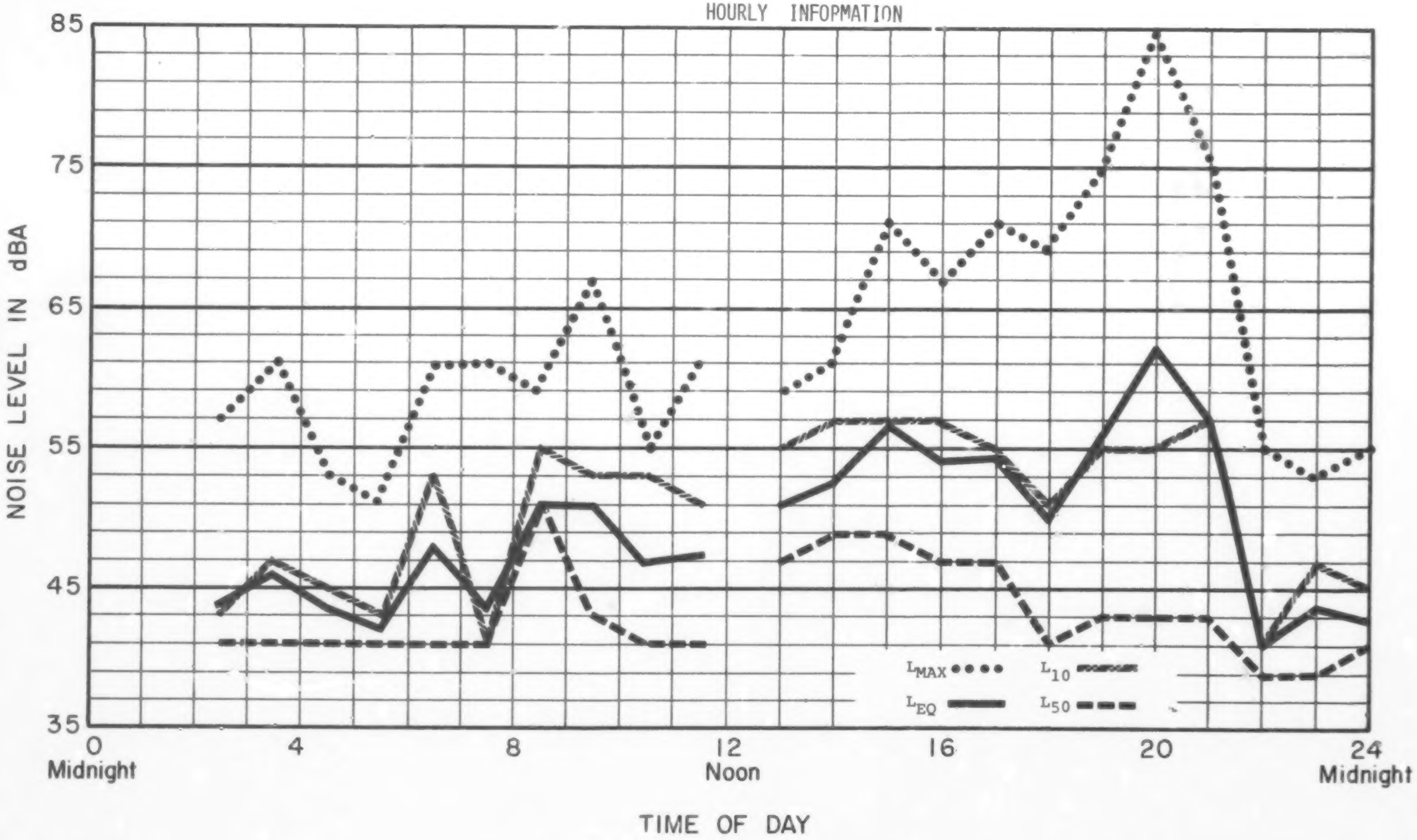
DECEMBER 3, 1973

TIME	WIND SPEED	REL. HUM.	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
1.50 - 2.35	20	87	43	41	41	57	43.9	50.6	19.0
2.40 - 3.30	20	90	47	41	41	61	46.3	55.6	35.0
3.35 - 4.20	20	90	45	41	41	53	43.4	49.7	27.0
4.55 - 5.40	20	90	43	41	41	51	42.1	46.2	19.0
5.45 - 6.35	19	90	53	41	41	61	48.2	60.6	59.0
6.45 - 7.30	17	87	41	41	41	61	43.4	48.2	11.0
7.35 - 8.20	13	90	51	41	41	59	47.3	58.5	51.0
8.30 - 9.15	14	90	55	51	41	59	51.0	66.6	67.0
9.20 -10.05	14	90	53	43	41	67	50.9	65.2	59.0
10.15 -11.00	16	87	53	41	41	55	41.8	58.5	59.0
11.05 -11.50	17	82	51	41	41	61	47.5	58.6	51.0
12.30 -13.30	18	82	55	47	41	59	51.0	64.1	67.0
13.30 -14.30	16	70	57	49	43	61	52.5	66.0	69.0
14.30 -15.30	14	55	57	49	45	71	56.6	71.5	63.0
15.30 -16.30	17	30	57	47	43	67	54.0	69.7	69.0
16.30 -17.30	15	29	55	47	41	71	54.7	70.1	67.0
17.30 -18.30	9	32	51	41	39	69	50.0	63.4	57.0
18.30 -19.30	15	32	55	43	39	75	55.9	74.1	73.0
19.30 -20.30	10	29	55	43	39	85	62.3	80.8	73.0
20.30 -21.30	14	27	57	43	39	75	57.0	76.8	81.0
21.30 -22.30	10	35	41	39	37	55	41.0	47.7	23.0
22.30 -23.30	9	40	47	39	39	53	43.8	53.2	41.0
23.30 -24.20	17	40	45	41	39	55	42.8	50.3	33.0

SUMMARY OF NOISE LEVELS AT P-8 FOR DECEMBER 3, 1973

DAILY INFORMATION: $L_{MAX} = 85$ $L_{10} = 53$ $L_{50} = 43$ $L_{90} = 39$
$L_{EQ} = 53.3$ $L_{DN} = 54.7$ $L_{NP} = 68.3$ TNI = 65.0

HOURLY INFORMATION



ENVIRONMENTAL NOISE CLASSIFIER DATA

SITE	DATE	TIME	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
S-1	11/30	21.05-21.48	43.5	43.5	43.5	53.5	44.4	48.3	13.5
S-2	11/30	12.45-13.29	51.0	48.5	46.0	66.0	50.5	57.7	36.0
S-3	11/30	15.32-16.16	63.5	56.0	53.5	88.5	65.4	79.0	63.5
S-3	12/1	16.45-17.26	61.0	56.0	53.5	73.5	58.7	68.6	53.5
S-4	11/30	3.30- 4.17	56.0	53.5	48.5	63.5	53.7	61.3	48.5
S-4	12/1	15.25-16.10	56.0	53.5	51.0	66.0	54.2	60.4	41.0
S-5	12/1	13.06-13.50	53.5	46.0	43.5	63.5	49.5	58.3	53.5
S-6	11/30	6.15- 7.02	58.5	56.0	53.5	63.5	57.0	65.1	43.5
S-7	11/30	18.40-19.20	63.5	58.5	56.0	71.0	61.2	70.3	56.0
S-7	12/1	6.35- 7.21	63.5	58.5	53.5	78.5	61.4	71.8	63.5
S-7	12/1	7.35- 8.00	66.0	58.5	53.5	73.5	62.4	75.0	73.5
S-8	11/30	9.20-10.07	56.0	48.5	48.5	66.0	53.0	61.7	48.5
S-8	11/30	10.20-10.59	56.0	53.5	48.5	66.0	53.8	61.9	48.5
S-8	12/1	21.42- 2.22	51.0	48.5	48.5	56.0	49.3	53.8	28.5
P-1	12/2	13.08-13.52	56.0	51.0	48.5	66.0	52.9	60.9	48.5
P-1	12/3	1.40- 2.23	53.5	51.0	48.5	63.5	52.2	59.5	38.5
P-1	12/3	14.42-15.50	58.5	56.0	53.5	73.5	57.0	63.8	43.5
P-2	12/2	0.20- 1.05	56.0	46.0	43.5	66.0	52.5	66.7	63.5
P-2	12/2	12.13-12.55	53.5	46.0	43.5	66.0	49.0	58.4	53.5
P-2	12/2	1.20- 2.05	53.5	48.5	46.0	66.0	53.1	64.8	46.0
P-2	12/3	13.35-14.35	58.5	53.5	53.5	73.5	56.2	63.4	43.5
P-3	12/2	9.05- 9.52	53.5	48.5	48.5	63.5	51.7	59.0	38.5
P-3	12/2	10.05-10.52	53.5	48.5	48.5	61.0	50.4	57.0	38.5
P-3	12/2	22.51-23.34	48.5	48.5	46.0	53.5	48.2	51.5	26.0
P-4	12/2	15.36-16.22	63.5	58.5	56.0	73.5	61.4	69.4	56.0
P-4	12/3	4.05-4.52	66.0	56.0	53.5	73.5	62.4	76.4	73.5
P-4	12/3	16.26-17.15	63.5	58.5	58.5	73.5	61.9	69.9	48.5
P-4	12/3	17.29-18.15	73.5	63.5	58.5	73.5	66.7	80.4	88.5
P-5	12/2	20.33-22.07	53.5	48.5	48.5	63.5	51.1	58.3	38.5
P-5	12/3	17.16-18.00	58.5	56.0	53.5	73.5	57.3	63.7	43.5

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SITE	DATE	TIME	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
P-5	12/3	22.13-22.55	53.5	48.5	46.0	61.0	51.6	60.0	46.0
P-5	12/3	23.33-24.05	53.5	48.5	43.5	61.0	50.4	59.8	53.5
P-6	12/2	3.30- 4.32	53.5	48.5	43.5	61.0	51.4	62.6	53.5
P-6	12/2	16.25-17.07	61.0	53.5	48.5	73.5	57.6	70.0	68.5
P-7	12/2	17.08-17.52	53.5	48.5	48.5	63.5	52.4	60.3	38.5
P-7	12/3	5.45- 6.31	56.0	53.5	48.5	66.0	54.0	62.1	48.5
P-7	12/3	19.15-20.15	48.5	43.5	43.5	63.5	47.2	55.1	33.5
P-8	12/2	7.20- 8.07	58.5	53.5	43.5	66.0	54.6	68.1	73.5
P-8	12/3	15.30-16.32	61.0	51.0	43.5	68.5	56.3	69.5	68.5

DATA FOR MAGNETIC TAPES PLAYED THROUGH
ENVIRONMENTAL NOISE CLASSIFIER

SITE	DATE	TIME	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
S-1	11/30	12.45-13.29	56.0	48.5	46.0	68.5	53.0	62.6	56.0
S-1	11/30	21.10-21.53	46.0	43.5	43.5	58.5	44.9	49.6	23.5
S-1	12/1	9.20-10.05	51.0	43.5	43.5	66.0	49.7	60.3	43.5
S-2	11/30	12.45-13.29	56.0	48.5	46.0	68.5	53.0	62.6	56.0
S-2	12/1	13.10-13.57	46.0	43.5	43.5	61.0	45.7	51.8	23.5
S-3	11/30	15.30-16.13	66.0	58.5	53.5	73.5	62.2	73.7	73.5
S-3	12/1	16.45-17.27	58.5	56.0	48.5	73.5	58.4	68.8	58.5
S-4	11/30	3.30- 4.13	56.0	51.0	46.0	63.5	53.2	62.2	56.0
S-4	11/30	16.19-17.01	58.5	56.0	53.5	73.5	57.3	63.8	43.5
S-4	12/1	15.36-16.21	56.0	56.0	51.0	63.5	54.9	62.0	41.0
S-5	11/30	0.45- 1.30	53.5	48.5	46.0	63.5	50.8	58.7	46.0
S-5	11/30	12.46-13.29	46.0	43.5	43.5	58.5	45.4	50.9	23.5
S-5	12/1	13.00-13.43	48.5	43.5	43.5	66.0	48.7	58.2	33.5
S-6	11/30	6.15- 7.01	58.5	56.0	53.5	66.0	56.9	65.1	43.5
S-6	11/30	17.54-18.37	56.0	53.5	51.0	63.5	53.7	58.6	41.0
S-6	11/30	19.03-19.33	56.0	53.5	48.5	66.0	53.9	61.3	48.5
S-6	12/1	18.15-18.57	53.5	51.0	48.5	61.0	51.8	57.7	38.5
S-7	11/30	18.38-19.20	66.0	61.0	58.5	73.5	63.0	70.8	58.5
S-7	12/1	6.35- 7.20	63.5	58.5	53.5	73.5	60.6	71.9	63.5
S-7	12/1	7.35- 8.21	66.0	58.5	53.5	76.0	62.2	72.9	73.5
S-7	12/1	18.23-19.06	63.5	58.5	56.0	73.5	61.3	69.4	56.0
S-7	12/1	19.25-20.08	63.5	58.5	53.5	73.5	61.3	71.4	63.5
S-8	11/30	9.20-10.05	56.0	48.5	46.0	66.0	53.2	63.8	56.0
S-8	11/30	10.20-10.59	56.0	51.0	48.5	68.5	54.4	64.1	48.5
S-8	11/30	21.34-22.13	48.5	46.0	43.5	56.0	47.7	53.4	33.5
S-8	11/30	22.29-23.08	53.5	48.5	46.0	66.0	50.2	58.6	46.0
S-8	12/1	23.31-24.11	48.5	46.0	43.5	56.0	46.4	52.0	33.5

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SITE	DATE	TIME	L_{10}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{np}	TNI
P-1	12/2	13.06-13.49	56.0	51.0	48.5	66.0	53.3	61.2	48.5
P-1	12/3	15.00-15.43	58.5	56.0	53.5	73.5	57.2	63.7	43.5
P-2	12/2	12.11-12.53	53.5	46.0	43.5	66.0	49.3	59.2	53.5
P-2	12/2	13.15-13.55	51.0	43.5	43.5	61.0	48.2	57.1	43.5
P-2	12/3	1.40- 2.25	53.5	46.0	43.5	66.0	51.9	63.9	53.5
P-3	12/2	10.05-10.51	48.5	46.0	46.0	61.0	48.1	53.5	26.0
P-3	12/2	22.52-23.33	48.5	46.0	46.0	53.5	47.4	51.8	26.0
P-3	12/3	9.05- 9.50	48.5	46.0	46.0	47.5	47.5	51.9	26.0
P-4	12/2	15.37-16.21	68.5	61.0	58.5	78.5	64.5	69.9	68.5
P-4	12/3	4.05- 4.48	56.0	46.0	43.5	71.0	53.7	67.5	63.5
P-4	12/3	16.40-17.23	66.0	61.0	56.0	78.5	64.2	74.5	66.0
P-4	12/3	17.39-18.20	68.5	61.0	56.0	73.5	63.8	75.2	76.0
P-5	11/29	14.56-15.40	53.5	46.0	43.5	73.5	52.7	63.4	53.5
P-5	12/1	22.13-22.56	53.5	48.5	46.0	61.0	49.8	57.8	46.0
P-5	12/1	23.21-24.05	51.0	46.0	43.5	58.5	48.3	56.3	43.5
P-5	12/3	17.12-17.29	58.5	56.0	53.5	63.5	56.2	62.0	43.5
P-6	12/2	3.30- 3.44	46.0	43.5	43.5	61.0	46.2	52.2	23.5
P-6	12/3	16.25-17.07	58.5	56.0	48.5	71.0	57.0	69.6	58.5
P-7	12/2	17.08-17.52	56.0	48.5	46.0	66.0	52.5	61.5	56.0
P-7	12/3	19.36-20.17	48.5	43.5	43.5	58.5	47.4	55.5	33.5
P-8	12/2	18.07-18.50	56.0	43.5	43.5	68.5	52.7	67.1	63.5
P-8	12/3	15.43-16.26	61.0	48.5	43.5	73.5	56.9	74.3	83.5

U. S. ENVIRONMENTAL PROTECTION AGENCY-REGION VI
Ambient Noise Survey of Waco Data Sheet

CHECK LIST

- ______ Have Sound Level Meter
- ______ Have Wind Screen
- ______ Have extra Batteries (B&K - 4) (G R - 8)
- ______ Have Watch with Sweep Second Hand
- ______ Have Tripod
- ______ Have Flashlight (with Extra Batteries)
- ______ Have Sony TC 55 Cassette Tape Recorder
- ______ Have Cassette (and spare)
- ______ Have Extra Batteries for Sony
- ______ Have Folding Chair
- ______ Have ID Letter and Personal ID
- ______ Have Food and Drink
- ______ Have Orange Marking Pen and spare
- ______ Have Calibrator and extra batteries
- ______ Have Calibration screwdriver
- ______ Have Weather Station
- ______ Know when I'll be relieved on duty
- ______ Project Headquarters No.
- ______ Have Clipboard and Enough Data Sheets (one for each hour plus 2 spares)
- ______ Know my station number location of site, location of microphone at site, person whom I will go with to site, duration of duty

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_____ Dress for weather

_____ Binoculars (if needed)

_____ Flashlight bracket and several rubber bands

_____ Watch with time of day

_____ Z flashlights

_____ Wire for attaching recorder to tripod

INSTRUCTIONS FOR NOISE MONITORING STATIONS

GENERAL DESCRIPTION OF WORKLOAD

One data sheet is to be completed during each hour of operation. During the first 20 minutes of each hour, the sound level will be recorded at 10 second intervals. Also, the tape recorder will be turned "on" at 5 minute intervals during this first 20 minutes of each hour. The recorder should be on for approximately 20 seconds at each 5 minute interval.

During the next 10 minutes of a given hour, weather data will be recorded. Then follows another 20 minute period of noise data taking similar to the first 20 minute period. The last 10 minutes of the hour will be used for calibration of the sound level meter.

PRELIMINARIES

Prior to the first sampling, the sound level meter must be calibrated. Depress the button marked "C". Turn the meter to the "on" position. Depress the button marked "BAT CHECK" and watch meter needle to see if it swings past the "BAT" mark on the meter.

Make sure that the button marked "SLOW" is in the out position. Turn the knob on the side of the

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instrument until the meter scale reads from 90 to 100 decibels. Place calibrator over the microphone (with windscreen removed). Start calibrator by depressing (and then releasing) the button on the side of the calibrator. Use a small screwdriver to adjust meter reading to 94 dB. Remove calibrator and replace windscreen. The calibrator will turn itself off in about one minute after the button on its side was last depressed. On the data sheet, record this calibration level in the blank labeled "CAL. BEGIN".

At the top of the data sheet, fill in your site (such as "P-2"), name, day of week, date, and the time that you will begin taking your data. If the battery "checked", mark this on the sheet. Make certain that "SLOW" button on meter is in the out position. Depress the "A" button and mark data sheet to indicate that you have checked the metet settings. Also, make certain that the tape recorder is loaded and that it will run.

TAKING NOISE DATA

First, make a 20 second tape recording and turn off the machine. Then begin taking sound level readings at ten second intervals by reading the sound level meter and marking the appropriate box on the data sheet. The boxes at each noise level are to be marked in succession. That is, if during the first hour of data sampling there were 17 readings made at the 64-66 dBA level, then the first 17 boxes of the row labeled 64-66 dBA should be marked.

After 5 minutes, start the tape recorder and continue taking noise level readings. After approximately 20 seconds turn off the recorder and continue taking noise level readings for another 5 minutes. Then turn on the tape recorder for another 20 seconds.

Continue this process until you have taken 20 minutes of noise level data, and have made five 20 second recordings.

During the next 10 minutes, the weather data will be recorded. Moisten the "wet" bulb of the psychrometer with the water provided in the small plastic bottle. Grasp the metal handle at the end of the chain and swing the psychrometer in a circle. After about 2 or 3 minutes, stop swinging the psychrometer. It is suggested that you "follow through" as you stop so as not to damage the instrument. Read both the wet and dry bulb temperatures and record the dry bulb temperature and read the relative humidity adjacent to the arrow indicator on the slide. Record the relative humidity on the data sheet.

Also record the wind direction, wind speed and the time that you took the weather data. The directions for using the wind speed meter are printed on the device. A magnetic compass is provided for reference in determining the wind direction. Give a brief description of the sky and wind conditions where indicated on the data sheet. (Example: SKY: Partly cloudy, WIND: Gusting and variable.)

After 10 minutes have elapsed since the last noise level reading was made, you will make a 20 second tape recording and begin taking noise level readings. Continue for 20 minutes in the same manner as you did during the first 20 minute period. The last 10 minutes of the hour is to be used to again calibrate the sound level meter and to answer the questions at the top of the data sheet. When you place the calibrator over the microphone and depress the "C" button and switch to the 90-100 dB scale, and before you make any adjustment to the meter, start the calibrator and record the meter reading on the data sheet in the blank labeled "CAL. FINISH". Then make your calibration. After answering the questions at the top of the data sheet, prepare a new data sheet for the next hour.

APPENDIX G

COMPUTER PROGRAM FOR HAND-HELD METER DATA REDUCTION AND SAMPLE OUTPUT

```
      PROGRAM MAIN(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION  ENVIR(10),SITE(10),NDB(30),NDBA(30),LDB(35),LDBA(35),
     1AAL(6),JAL(6),CASE(5),SOURCE(12),AL10(24),AL50(24),ALEQ(24),
     2SUMN30(30),SUMD1(30),SUMD2(30),SUMD3(30)
      REAL      LDN,LNP,LUM,LUMM,NPL                                   MOD1
      INTEGER   DAY
C**************************************************************************
C   THIS PROGRAM IS GOOD FOR NOISE-LEVELS THAT FALL BETWEEN 31DB AND 89DB
C**************************************************************************
      KKK=30
      LLL=KKK+5
      READ 9,  NDAYS
    9 FORMAT(I5)
      NDAY=1
      IDAY1=4H 30
      IDAY2=4H 1
      IDAY3=4H 2
      IDAY4=4H 3
      DO 840 I =1,KKK
      SUMN30(I)=0.
      SUMD1(I)=0.
      SUMD2(I)=0.
      SUMD3(I)=0.
  840 CONTINUE
      TOTN30=0.
      TOTD1=0.
      TOTD2=0.
      TOTD3=0.
 2000 CONTINUE
      WRITE(6,73)
      READ 10,  NCASES,(SITE(I),I=1,10),MON,DAY,YEAR
   10 FORMAT(1X,I4,10A5,3A4)
      WRITE (6,50)
   50 FORMAT(100H*************************************************************
     1***************************************)
      WRITE (6,51)  (SITE(I),I=1,10)
   51 FORMAT (3X,7HSITE = ,10A5)
      WRITE (6,52) MON,DAY,YEAR ,NCASES
   52 FORMAT(3X,7HDATE = ,3A4,15X,8HSHEETS =,I4)
      WRITE (6,50)
      IDATE=DAY
      DO 99 M=1,LLL                                                    MOD1
      LDB(M)=0
      LDBA(M)=0
   99 CONTINUE
      DO 100 M=1,KKK
      NDBA(M)=0
  100 CONTINUE
      SUM10=0.
      SUM50=0.
      SUMEQ=0.
      KSUM=0
      MMAX=0
      MMIN=500
      NCASE=1
      TS=00.00
      TF=00.00
```

```
            KDAY=0
            NIGHT=0
      1000  CONTINUE
            WRITE(6,72)
        60  FORMAT(4X,I3,5X,18HHOURLY INFORMATION,5X,10A5,3A4/)
            WRITE (6,60)  NCASE, (SITE(I),I=1,10),MON,DAY,YEAR
            READ 12,  TS,TF,(CASE(I),I=1,5)
        12  FORMAT (2(2X,F5.2),5A6)
            READ 13,  (ENVIR(I),I=1,12)
        13  FORMAT (12A6)
      C     READ IN DESCRIPTION OF SOURCES
            READ 980,(SOURCE(I),I=1,12)
       980  FORMAT(12A6)
      C        READ IN NUMBER OF SAMPLES
            READ 14, (NDB(N),N=1,KKK)
        14  FORMAT(5(1X,I3)/15(1X,I3)/10(1X,I3))
            WRITE (6,61)  TS,TF  ,(CASE(I),I=1,5)
        61  FURMAT(3X,6HHOUR =,3X,F5.2,1H-,F5.2,10X,5A6)
            WRITE (6,62)  (ENVIR(I),I=1,12)
        62  FORMAT(3X,9HWEATHER =,2X,12A6)
            WRITE(6,981) (SOURCE(I),I=1,12)
       981  FURMAT(3X,12A6/)
            WRITE (6,63)
        63  FURMAT(11X,3HDBA,4X,21HNUMBER OF OCCURRENCES)
      C         PRINT OUT AMPLITUDE DISTRIBUTION
            DO 98 N =1,KKK
            NS=2*N+28
            NT=NS+2
            IF(NDB(N).LE.0)  NDB(N)=0
            WRITE (6,71)  NS,NT,NUB(N)
        98  CUNTINUE
        71  FORMAT (10X,I2,1H-,I2,2X,I5)
        72  FORMAT(1X,2H  )
        73  FORMAT(1H )
      C    FIND TOTAL NUMBER OF SAMPLES FOR THE HOUR
            ISUM=0
            DU 101 N=1,KKK
            ISUM=ISUM+NDB(N)
       101  CUNTINUE
            WRITE (6,75)  ISUM
        75  FORMAT(3X,26HTOTAL NUMBER OF SAMPLES = ,I4/)
      C          FIND PERCENT OF TOTAL
            AAL(1)=.001*ISUM
            AAL(2)=0.01*ISUM
            AAL(3)=00.1*ISUM
            AAL(4)=  .5*ISUM
            AAL(5)=  .9*ISUM
            AAL(6)= .99*ISUM
      C               SEARCH FOR LMIN
            DO 704 N =1,KKK
            IF(NDB(N)-1)  704,701,701
       701  CONTINUE
            LMIN=2*N+29
            GO TO 702
       704  CONTINUE
      C             SEARCH FOR LMAX
       702  CONTINUE
```

```
              DO 703 N =1,KKK
              MPP=KKK-N+1
              IF(NDB(MPP)-1)  703,705,705
          705 CONTINUE
              LMAX=2*MPP+29
              GO TO 706
          703 CONTINUE
        C              CALCULATE LN#S
          706 CONTINUE
              DO 102 MM=1,6
              ISUB=0
              DO 707 NN =1,KKK
              KK=KKK-NN+1
              ISUB=NDB(KK)+ISUB
              IF(ISUB-AAL(MM))  707,708,708
          708 CONTINUE
              JAL(MM)=29.+2.*KK
              GO TO 102
          707 CONTINUE
          102 CONTINUE
        C   CALCULATE LNP (GAUSSIAN) AND TNI
              DD=JAL(3)-JAL(5)
              NPL=JAL(4)+DD+DD*DD/60.
              TNIM=4.*DD+(JAL(5)-30.)
        C              CONTROL FOR NIGHTTIME PENALTY
              IF(TF.LT.7..OR.TF.GT.22.)  GO TO 521
              KDAY=KDAY+1
              DO 116 I=1,KKK
              LDB(I)=NDB(I)
          116 CONTINUE
              GO TO 525
          521 CONTINUE
        C              APPLY 10DB PENALTY FOR NIGHT
              NIGHT=NIGHT+1
              DO 115 KL=1,KKK
              LP=KL+5
              LDB(LP)=NDB(KL)
          115 CONTINUE
          525 CONTINUE
        C           SUMMATION OF NUMBER OF SAMPLES FOR THE DAY
              DO 105 JJ=1,KKK
              NDBA(JJ)=NDB(JJ)+NDBA(JJ)
              LDBA(JJ)=LDB(JJ)+LDBA(JJ)
          105 CONTINUE
              KSUM=KSUM+TSUM
              IF(LMAX.GT.MMAX)  MMAX=LMAX
              IF(LMIN.LT.MMIN)  MMIN=LMIN
        C      PRINT OUT LN#S,TNI AND LNP (GAUSSIAN)
              WRITE (6,76) LMAX
              WRITE (6,77)  JAL(1)
              WRITE (6,78)  JAL(2)
              WRITE (6,79)  JAL(3)
              WRITE (6,80)  JAL(4)
              WRITE (6,81)  JAL(5)
              WRITE (6,82)  JAL(6)
              WRITE(6,83)  LMIN
           76 FORMAT(10X,7HLMAX = ,I3)
```

```
   77 FORMAT (10X,7HL.1   = ,I3)
   78 FORMAT(10X,7HL1    = ,I3)
   79 FORMAT(10X,7HL10   = ,I3,
     196H   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC
     2 AREAS,LIB, SPT ARENAS,HOTELS,ETC)
   80 FORMAT (10X,7HL50   = ,I3)
   81 FORMAT (10X,7HL90   = ,I3)
   82 FORMAT (10X,7HL99   = ,I3)
   83 FORMAT (10X,7HLMIN  = ,I3/)
   84 FORMAT (3X,6HTNI = ,F5.1)
   85 FORMAT(3X,17HLNP (GAUSSIAN) = ,F5.1,5X
     1,34H LNP=85 MAX FOR AIRCRAFT SUGGESTED)
      WRITE (6,84)  TNIH
      WRITE (6,85)  NPL
C           COMPUTE LAV AND MEAN
      VE=0.
      UNN=0.
      DO 106 LL =1,KKK
      PP=0.1*(2.*LL+29.)
      XPO=FLOAT(NDR(LL))/FLOAT(ISUM)
      UN=XPO*10.**PP
      UNN=UN+UNN
      VER=XPO*PP*10.
      VE=VE+VER
  106 CONTINUE
      AV=10.*ALOG10(UNN)
      AL10(NCASE)=JAL(3)
      AL50(NCASE)=JAL(4)
      ALEQ(NCASE)=AV
      SUM10=SUM10+AL10(NCASE)/FLOAT(NCASES)
      SUM50=SUM50+AL50(NCASE)/FLOAT(NCASES)
      SUMEQ=SUMEQ+ALEQ(NCASE)/FLOAT(NCASES)
C           COMPUTE SIGMA AND LNP
      DQQ=0.
      DO 107 LL =1,KKK
      FN=ABS(2.*LL+29.-VE)
      DQ=FLOAT(NDR(LL))*FN*FN/FLOAT(ISUM)
      DQQ=DQ+DQQ
  107 CONTINUE
      SIG=SQRT(DQQ)
      LNP=AV+2.56*SIG
      WRITE(6,89)  LNP
      WRITE(6,87)  AV
   91 FORMAT(3X,6HLAV = ,F5.1)
      WRITE (6,72)
      WRITE (6,50)
      WRITE(6,73)
      NCASE=NCASE+1
      IF(NCASE.LE.NCASES)  GO TO 1000
C***********************************************************************
C          START CALCULATIONS FOR THE WHOLE DAY
C                FIND PERCENT OF TOTAL
C***********************************************************************
      AAL(1)=.001*KSUM
      AAL(2)=0.01*KSUM
      AAL(3)=  .1*KSUM
      AAL(4)=  .5*KSUM
```

```
            AAL(5)=  .9*KSUM
            AAL(6)= .99*KSUM
      C        CALCULATE THE LN≠S AND TNI
            DO 108 MN=1,6
            JSUB=0
            DO 709 NM =1,KKK
            KK=KKK-NM+1
            JSUB=NDBA(KK)+JSUB
            IF(JSUB-AAL(MN))    709,710,710
        710 CONTINUE
            JAL(MN)=29.+2.*KK
            GO TO 108
        709 CONTINUE
        108 CONTINUE
            TNID=4.*(JAL(3)-JAL(5))+(JAL(5)-30.)
      C           COMPUTE LAV AND MEAN
            AVE=0.
            DUNN=0.
            DO 111 LL=1,KKK
            POM=0.1*(2.*LL+29.)
            DBA=NDBA(LL)
            EXPR=DBA/KSUM
            DUN=EXPR*10.**POM
            DUNN=DUNN+DUN
            AVER=EXPR*POM*10.
            AVE=AVE+AVER
        111 CONTINUE
            AAVER=10.*ALOG10(DUNN)
      C           COMPUTE LDN
            LUMM=0.
            DO 119 LL=1,LLL
            PDN=0.1*(2.*LL+29.)
            DBAL=LDBA(LL)
            EDN=DBAL/KSUM
            LUM=EDN*10.**PDN
            LUMM=LUM+LUMM
        119 CONTINUE
            LDN=10.*ALOG10(LUMM)
      C        FIND SIGMA AND LNP
            SSQQ=0.
            DO 120 LL=1,KKK
            FN=ABS(2.*LL+29.-AVE)
            SSQ=FLOAT(NDBA(LL))*FN*FN/FLOAT(KSUM)
            SSQQ=SSQ+SSQQ
        120 CONTINUE
            SIGMA=SQRT(SSQQ)
            LNP=AAVER+2.56*SIGMA
            WRITE (6,72)
            WRITE(6,86)  NDAY,(SITE(I),I=1,10),MON,DAY,YEAR
         86 FORMAT(1X,I3,10X,17HDAILY INFORMATION,5X,10A5,3A4/)
            WRITE (6,63)
      C   PRINT OUT AMPLITUDE DISTRIBUTION FOR THE DAY
            DO 97 N =1,KKK
            NS=2*N+28
            NT=NS+2
            WRITE (6,71)  NS,NT,NDBA(N)
         97 CONTINUE
      WRITE (6,72)
      WRITE (6,75) KSUM
      WRITE (6,76)  MMAX
      WRITE (6,77)  JAL(1)
      WRITE (6,78)  JAL(2)
      WRITE (6,79)  JAL(3)
      WRITE (6,80)  JAL(4)
      WRITE (6,81)  JAL(5)
      WRITE (6,82)  JAL(6)
      WRITE (6,83)  MMIN
      WRITE (6,84)   TNID
      WRITE(6,87)  AAVER
      WRITE(6,90)  KDAY,NIGHT
      WRITE (6,88)  LDN
      WRITE (6,89)  LNP
      WRITE (6,72)
   87 FORMAT(3X,6HLEQ = ,F5.1)
   88 FORMAT(3X,6HLDN = ,F5.1,5X,
     179H  55 IS EPA IDENT.INTERFERENCE LEVEL.  75 IS EPA IDENT.HEARING
     2PROT. LEVEL)
   89 FORMAT(3X,6HLNP = ,F5.1,5X
     1,34H LNP=85 MAX FOR AIRCRAFT SUGGESTED)
   90 FORMAT(2X,13HLDN BASED ON ,I2,19H DAYTIME HOURS AND ,I2,16H NIGHTTIME HOUR
     1IME HOURS)
      WRITE (6,50)
      EX81=0.
      EX75=0.
      EX65=0.
      EL45=0.
      DO 711 J=27,KKK
      EX81=NDBA(J)+EX81
  711 CONTINUE
      PG81=EX81/KSUM*100.
      DO 712 J =24,26
      EX75=EX75+NDBA(J)
  712 CONTINUE
      PG75=(EX81+EX75)/KSUM*100.
      DO 713 J =19,23
      EX65=NDBA(J)+EX65
  713 CONTINUE
      PG65=(EX81+EX75+EX65)/KSUM*100.
      PL65=100.-PG65
      DO 714 J =8,KKK
      EL45=EL45+NDBA(J)
  714 CONTINUE
      PL45=EL45/KSUM*100.
      WRITE(6,92)  PG81
      WRITE(6,93)  PG75
      WRITE(6,94)  PG65
      WRITE(6,96)  PL45
   92 FORMAT(3X,15HEXCEEDS 81 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     140H 4.2 PERCENT (24HR) NOT ACCEPTABLE (HUD))
   93 FORMAT(3X,15HEXCEEDS 75 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     147H 33.3 PERCENT (24HR) STRONGLY DISCOURAGED (HUD))
   94 FORMAT(3X,15HEXCEEDS 65 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     148H 33.3 PERCENT (24HR) NORMALLY UNACCEPTABLE (HUD))
   96 FORMAT(3X,15HEXCEEDS 45 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
        148H 33.3 PERCENT (24HR) NORMALLY   ACCEPTABLE (HUD))
         WRITE (6,50)
         R1=0.
         R2=0.
         R3=0.
         S10=0.
         S50=0.
         SEQ=0.
         DO 811 I = 1,NCASES
         S10=S10+(AL10(I)-SUM10)**2
         S50=S50+(AL50(I)-SUM50)**2
         SEQ=SEQ+(ALEQ(I)-SUMEQ)**2
         R1=R1+(AL10(I)-SUM10)*(ALEQ(I)-SUMEQ)
         R2=R2+(AL50(I)-SUM50)*(ALEQ(I)-SUMEQ)
         R3=R3+(AL50(I)-SUM50)*(AL10(I)-SUM10)
     811 CONTINUE
         SIG10=SQRT(S10/FLOAT(NCASES))
         SIG50=SQRT(S50/FLOAT(NCASES))
         SIGEQ=SQRT(SEQ/FLOAT(NCASES))
         RE010=R1/(SIG1 *SIGEQ)/FLOAT(NCASES)
         RE050=R2/(SIG50*SIGEQ)/FLOAT(NCASES)
         R1050=R3/(SIG10*SIG50) /FLOAT(NCASES)
         WRITE(6,812)   RE010
         WRITE(6,813)   RE050
         WRITE(6,814)   R1050
         WRITE(6,815)   SUM10
         WRITE(6,816)   SUM50
         WRITE(6,817)   SUMEQ
         WRITE(6,818)   SIG10
         WRITE(6,819)   SIG50
         WRITE(6,820)   SIGEQ
     812 FORMAT(5X,28HCORRELATION BET L10 AND LAV=,F7.3)
     813 FORMAT(5X,28HCORRELATION BET L50 AND LAV=,F7.3)
     814 FORMAT(5X,28HCORRELATION BET L50 AND L10=,F7.3)
     815 FORMAT(5X,10HL10(AVE) =,F7.3)
     816 FORMAT(5X,10HL50(AVE) =,F7.3)
     817 FORMAT(5X,10HLEQ(AVE) =,F7.3)
     818 FORMAT(5X,9HSIG(10) =,F7.3)
     819 FORMAT(5X,9HSIG(50) =,F7.3)
     820 FORMAT(5X,9HSIG(EQ) =,F7.3)
C*************************************************************************
C
C*************************************************************************
         IF(IDATE.NE.IDAY1)  GO TO 830
         DO 839 K =1,KKK
         RATIO=FLOAT(NDBA(K)) /FLOAT(KSUM)
         SUMN30(K)=SUMN30(K)+RATIO
     839 CONTINUE
         GO TO 853
     830 CONTINUE
         IF(IDATE.NE.IDAY2)  GO TO 831
         DO 841 K =1,KKK
         RATIO=FLOAT(NDBA(K)) /FLOAT(KSUM)
         SUMD1(K)=SUMD1(K)+RATIO
     841 CONTINUE
         GO TO 853
     831 CONTINUE
```

```
      IF(IDATE.NE.IDAY3)  GO TO 832
      DO 842 K =1,KKK
      RATIO=FLOAT(NDRA(K)) /FLOAT(KSUM)
      SUMD2(K)=SUMD2(K)+RATIO
  842 CONTINUE
      GO TO 853
  832 CONTINUE
      IF(IDATE.NE.IDAY4)  GO TO 833
      DO 843 K =1,KKK
      RATIO=FLOAT(NDRA(K)) /FLOAT(KSUM)
      SUMD3(K)=SUMD3(K)+RATIO
  843 CONTINUE
      GO TO 853
  833 CONTINUE
      WRITE(6,834)
  834 FORMAT(5X,41HDATE HAS BEEN FOULED UP - CHECK DATE CARD)
  853 CONTINUE
      NDAY=NDAY+1
      IF(NDAY.LE.NDAYS)  GO TO 2000
      WRITE(6,860)
      DO 844 N =1,KKK
      NS=2*N+28
      NT=NS+2
      WRITE(6,861)  NS,NT,SUMN30(N),SUMD1(N),SUMD2(N),SUMD3(N)
      TOTN30=TOTN30+SUMN30(N)
      TOTD1=TOTD1+SUMD1(N)
      TOTD2=TOTD2+SUMD2(N)
      TOTD3=TOTD3+SUMD3(N)
  844 CONTINUE
  860 FORMAT(6X,3HDHA,8X,12HNOV  30 1973,9X,12HDEC  1  1973,8X,12HDEC  2  1973,
     1  1973,8X,12HDEC  3  1973)
  861 FORMAT(5X,I2,1H-,I2,4(6X,F14.10))
      WRITE(6,862)  TOTN30,TOTD1,TOTD2,TOTD3
  862 FORMAT(4X,6HTOTAL=,4(6X,F14.10))
C                                            REPLACE THE ACCOUNT CARD
      END
```

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****************************************************************************************************
   SITE =     S-5  TIMBERCREST
   DATE = NOV  30 1973                   SHEETS =  24
****************************************************************************************************

    1     HOURLY INFORMATION          S-5  TIMBERCREST                                NOV  30 1973

   HOUR =     0.00- 1.00          0     SHEET-1 (CLOGSTON-STIEFE
   WEATHER =    TEMP=48,WIND(SSE)=0-1MPH,R.H.=60, BP=738 MM HG  SKY=CLR  0
    SOURCES  MAJ=DOGS  MIN=AUTO,MAIL  LOW BK FEW SFT VAR

          DBA    NUMBER OF OCCURRENCES
         30-32       0
         32-34       0
         34-36       0
         36-38       0
         38-40       0
         40-42       0
         42-44      27
         44-46      86
         46-48      62
         48-50      37
         50-52      15
         52-54       2
         54-56       3
         56-58       1
         58-60       0
         60-62       0
         62-64       0
         64-66       0
         66-68       0
         68-70       0
         70-72       0
         72-74       0
         74-76       0
         76-78       0
         78-80       0
         80-82       0
         82-84       0
         84-86       0
         86-88       0
         88-90       0
   TOTAL NUMBER OF SAMPLES =  233

         LMAX =  57
         L.1  =  57
         L1   =  55
         L10  =  49    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
         L50  =  47
         L90  =  43
         L99  =  43
         LMIN =  43

   TNI =  37.0
   LNP (GAUSSIAN) =  53.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
   LNP =  53.9      LNP=85 MAX FUR AIRCRAFT SUGGESTED
   LEQ =  47.5

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```
2     HOURLY INFORMATION        S-5  TIMBERCREST                          NOV  30 1973
HOUR =     1.00- 2.00                SHEET-2 (CLOGSTON-STIEFEL
WEATHER =    TEMP=47, WIND(SSE) 0-1MPH,R.H.=60  BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=DOGS  MIN=AUTO,RAIL  LOW BK FEW SFT VAR

       DBA    NUMBER OF OCCURRENCES
      30-32      0
      32-34      0
      34-36      0
      36-38      0
      38-40      0
      40-42      0
      42-44     31
      44-46     87
      46-48     87
      48-50     22
      50-52      3
      52-54      2
      54-56      0
      56-58      2
      58-60      1
      60-62      1
      62-64      0
      64-66      1
      66-68      0
      68-70      0
      70-72      0
      72-74      0
      74-76      0
      76-78      0
      78-80      0
      80-82      0
      82-84      0
      84-86      0
      86-88      0
      88-90      0
 TOTAL NUMBER OF SAMPLES =  237

      LMAX =  65
      L.1  =  65
      L1   =  59
      L10  =  49   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
      L50  =  47
      L90  =  43
      L99  =  43
      LMIN =  43

 TNI =  37.0
 LNP (GAUSSIAN) =  53.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  55.5      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  48.4

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3     HOURLY INFORMATION         S-5  TIMBERCREST                                NOV  30 1973

HOUR =     2.00- 3.00                   SHEET-3 (CLOGSTON-GRIFFIN
WEATHER =    TEMP=45, W IND(SSW) 0-4MPH,R,H.=62  RP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=RAIL,TRUCK,AUTO,DOGS  LOW BK FEW SFT VAR

        DRA    NUMBER OF OCCURRENCES
       30-32      0
       32-34      0
       34-36      0
       36-38      0
       38-40      0
       40-42      0
       42-44     19
       44-46    115
       46-48     77
       48-50     15
       50-52      2
       52-54      1
       54-56      1
       56-58      1
       58-60      0
       60-62      0
       62-64      1
       64-66      0
       66-68      0
       68-70      0
       70-72      0
       72-74      0
       74-76      0
       76-78      0
       78-80      0
       80-82      0
       82-84      0
       84-86      0
       86-88      0
       88-90      0
 TOTAL NUMBER OF SAMPLES =  232

       LMAX =  63
       L.1  =  63
       L1   =  55
       L10  =  47   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  45
       L90  =  45
       L99  =  43
       LMIN =  43

 TNI =  23.0
 LNP (GAUSSIAN) =  47.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  52.8       LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  47.3

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4     HOURLY INFORMATION          S-5  TIMBERCREST                                  NOV  30 1973
HOUR =     3.00- 4.00                  SHEET-3 (CLOGSTON-GRIFFIN
WEATHER =    R.H.=64, TEMP=44, WIND(SSW) 0-2MPH BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=RAIL,TRUCK,AUTO,DOGS  LOW BK FEW SFT VAR

         DBA    NUMBER OF OCCURRENCES
         30-32       0
         32-34       0
         34-36       0
         36-38       0
         38-40       0
         40-42       0
         42-44       1
         44-46      34
         46-48     112
         48-50      80
         50-52      12
         52-54       1
         54-56       1
         56-58       1
         58-60       0
         60-62       0
         62-64       0
         64-66       0
         66-68       0
         68-70       0
         70-72       0
         72-74       0
         74-76       0
         76-78       0
         78-80       0
         80-82       0
         82-84       0
         84-86       0
         86-88       0
         88-90       0
TOTAL NUMBER OF SAMPLES =  242

         LMAX =  57
         L.1  =  57
         L1   =  53
         L10  =  49   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC RFC AREAS,LTR, SPT ARENAS,HOTELS,ETC
         L50  =  47
         L90  =  45
         L99  =  45
         LMIN =  43

TNI =  31.0
LNP (GAUSSIAN) =  51.3      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  52.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  48.1
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5     HOURLY INFORMATION          S-5  TIMBERCREST                              NOV  30 1973

HOUR =    4.00- 5.00                     SHEET-4 (CLOGSTON-HORTON)
WEATHER =  R.H.=68, TEMP=43, WIND(S) 2MPH BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=RAIL,TRUCK MIN=AUTO,DOGS  LOW -K FEW SFT VAR

        DBA    NUMBER OF OCCURRENCES
       30-32      0
       32-34      0
       34-36      0
       36-38      0
       38-40      0
       40-42      0
       42-44      0
       44-46      0
       46-48      5
       48-50     53
       50-52     50
       52-54     57
       54-56     47
       56-58     20
       58-60      4
       60-62      2
       62-64      1
       64-66      0
       66-68      1
       68-70      0
       70-72      0
       72-74      0
       74-76      0
       76-78      0
       78-80      0
       80-82      0
       82-84      0
       84-86      0
       86-88      0
       88-90      0
TOTAL NUMBER OF SAMPLES =  240

       LMAX =  67
       L.1  =  67
       L1   =  61
       L10  =  57   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC RFC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  53
       L90  =  49
       L99  =  47
       LMIN =  47

TNI =  51.0
LNP (GAUSSIAN) =  62.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  61.8       LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  54.0

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 6     HOURLY INFORMATION          S-5  TIMBERCREST                                     NOV  30 1973

HOUR =     5.00- 6.00                 SHEET-5 (CLOGSTON-HORTON)
WEATHER =    R.H.=64, TEMP=43, WIND(S) 3MPH  BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=RAIL,DOGS MIN=TRUCK,AUTO,LOW BK SM MED VAR

        DBA     NUMBER OF OCCURRENCES
        30-32       0
        32-34       0
        34-36       0
        36-38       0
        38-40       0
        40-42       0
        42-44       0
        44-46       0
        46-48      27
        48-50      60
        50-52      63
        52-54      22
        54-56      22
        56-58      13
        58-60       6
        60-62       9
        62-64       4
        64-66       2
        66-68       1
        68-70       2
        70-72       3
        72-74       0
        74-76       0
        76-78       0
        78-80       0
        80-82       0
        82-84       0
        84-86       0
        86-88       0
        88-90       0
 TOTAL NUMBER OF SAMPLES =  234

        LMAX =  71
        L.1  =  71
        L1   =  71
        L10  =  59   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
        L50  =  51
        L90  =  47
        L99  =  47
        LMIN =  47

 TNI =  65.0
 LNP (GAUSSIAN) =  65.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  69.6       LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  57.1

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7     HOURLY INFORMATION        S-5  TIMBERCREST                              NOV  30 1973

HOUR =     6.00- 7.00               SHEET-7  (TINDELL-ALEXANDER
WEATHER =    R.H.=68, TEMP=41, WIND(SSE) 1MPH BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,BIRDS,DOGS MIN=RAIL,TRUCK,RES.,INSECTS,ROOSTER,LW AK

          DBA     NUMBER OF OCCURRENCES
         30-32      0
         32-34      0
         34-36      0
         36-38      0
         38-40      0
         40-42      0
         42-44      0
         44-46      0
         46-48     16
         48-50    102
         50-52     78
         52-54     27
         54-56      7
         56-58      5
         58-60      4
         60-62      1
         62-64      0
         64-66      0
         66-68      0
         68-70      0
         70-72      0
         72-74      0
         74-76      0
         76-78      0
         78-80      0
         80-82      0
         82-84      0
         84-86      0
         86-88      0
         88-90      0
   TOTAL NUMBER OF SAMPLES =  240

          LMAX =  61
          L.1  =  61
          L1   =  59
          L10  =  53    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
          L50  =  51
          L90  =  49
          L99  =  47
          LMIN =  47

   TNI =  35.0
   LNP (GAUSSIAN) =  55.3      LNP=85 MAX FOR AIRCRAFT SUGGESTED
   LNP =  57.5       LNP=85 MAX FOR AIRCRAFT SUGGESTED
   LEQ =  51.4

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8     HOURLY INFORMATION        5-5  TIMBERCREST                              NOV  30 1973

HOUR =    7.00- 7.47                 SHEET-8   (TINDELL-ALEXANDE
WEATHER =   R.H.=75, TEMP=41, WIND(SSW) 2.5MPH BP=7 38 MM HG SKY=CLR  0
 SOURCES  MAJ=AUTO,BIRDS,DOGS,MIN=RAIL,TRK,RES,INSECTS,ROOSTER, LW BK FW

        DBA    NUMBER OF OCCURRENCES
       30-32      0
       32-34      0
       34-36      0
       36-38      0
       38-40      0
       40-42      0
       42-44      0
       44-46      0
       46-48      0
       48-50     27
       50-52     76
       52-54     99
       54-56     20
       56-58     12
       58-60      5
       60-62      7
       62-64      0
       64-66      0
       66-68      0
       68-70      0
       70-72      0
       72-74      0
       74-76      0
       76-78      0
       78-80      0
       80-82      0
       82-84      0
       84-86      0
       86-88      0
       88-90      0
 TOTAL NUMBER OF SAMPLES =  246

       LMAX =  61
       L.1  =  61
       L1   =  61
       L10  =  55    FMWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  53
       L90  =  49
       L99  =  49
       LMIN =  49

 TNI =  43.0
 LNP (GAUSSIAN) =  59.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  60.2        LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  53.6

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9     HOURLY INFORMATION         S-5  TIMBERCREST                                   NOV  30 1973
HOUR =     8.00- 9.00              SHEET-9 (CLOGSTON-ALEXANDER
WEATHER =   R.H.=65, TEMP=46, WIND(SW) 3MPH, BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,MIN=TRUCK,BIRDS,DOGS  LW BK FW MED VAR

        DBA    NUMBER OF OCCURRENCES
       30-32        0
       32-34        0
       34-36        0
       36-38        0
       38-40        0
       40-42        0
       42-44        0
       44-46        0
       46-48        0
       48-50        1
       50-52      129
       52-54       94
       54-56        9
       56-58        4
       58-60        2
       60-62        1
       62-64        1
       64-66        0
       66-68        0
       68-70        0
       70-72        0
       72-74        0
       74-76        0
       76-78        0
       78-80        0
       80-82        0
       82-84        0
       84-86        0
       86-88        0
       88-90        0
TOTAL NUMBER OF SAMPLES =  241

        LMAX =  63
        L.1  =  63
        L1   =  59
        L10  =  53   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
        L50  =  51
        L90  =  51
        L99  =  51
        LMIN =  49

TNI =  29.0
LNP (GAUSSIAN) =  53.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  57.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  52.7

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10     HOURLY INFORMATION        S-5  TIMBERCREST                               NOV  30 1973
HOUR #    9.00-10.00              SHEET-10 (BARNES-ALEXANDER)
WEATHER =   R.H.=54, TEMP=55, WIND(S) 1.5MPH  BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,TRK,RES. MIN=RAIL,INDUST,BIRDS,DOGS. LW BK SM VAR

      DBA    NUMBER OF OCCURRENCES
     30-32       0
     32-34       0
     34-36       0
     36-38       0
     38-40       0
     40-42       0
     42-44       0
     44-46       0
     46-48       2
     48-50      34
     50-52     100
     52-54      81
     54-56      24
     56-58       3
     58-60       3
     60-62       2
     62-64       0
     64-66       0
     66-68       0
     68-70       0
     70-72       0
     72-74       0
     74-76       0
     76-78       0
     78-80       0
     80-82       0
     82-84       0
     84-86       0
     86-88       0
     88-90       0
TOTAL NUMBER OF SAMPLES =  249

      LMAX =  61
      L.1  =  61
      L1   =  59
      L10  =  55   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
      L50  =  51
      L90  =  49
      L99  =  49
      LMIN =  47

TNI =  43.0
LNP (GAUSSIAN) =  57.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  58.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  52.6

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11     HOURLY INFORMATION         S-5  TIMBERCREST                                   NOV  30 1973

HOUR =   10.00-11.00              SHEET-11 (TORRES-ALEXANDER)
WEATHER =   R.H.=52, TEMP=64, WIND(SSW) 7MPH  BP=759 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,BIRDS,RES. MIN=RAIL,DOGS. LW BK FW SFT VAR

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40       0
       40-42      29
       42-44      48
       44-46      57
       46-48      61
       48-50      26
       50-52       7
       52-54       2
       54-56       8
       56-58       3
       58-60       2
       60-62       2
       62-64       0
       64-66       0
       66-68       0
       68-70       0
       70-72       0
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
 TOTAL NUMBER OF SAMPLES =  245

       LMAX =  61
       L.1  =  61
       L1   =  59
       L10  =  49   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LTR, SPT ARENAS,HOTELS,ETC
       L50  =  45
       L90  =  41
       L99  =  41
       LMIN =  41

 TNI =  43.0
 LNP (GAUSSIAN) =  54.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  58.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  48.6

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     HOURLY INFORMATION        5-5  TIMBERCREST                                  NOV  30 1973

HOUR =   11.00-12.00                SHEET-12 (TORRES-ALEXANDER)
WEATHER =    R.H.=44, TEMP=66, W IND(SSE) 8MPH  BP=757 MM HG  SKY=CLR  0
 SOURCES  MAJ=RAIL,AUTO,CYCLE,RESD, MIN=DOGS,MOWER   LW RK SM SFT VAR

       DBA    NUMBER OF OCCURRENCES
      30-32       0
      32-34       0
      34-36       2
      36-38       6
      38-40      33
      40-42      49
      42-44      59
      44-46      31
      46-48      21
      48-50      13
      50-52      11
      52-54       6
      54-56       6
      56-58       3
      58-60       2
      60-62       0
      62-64       0
      64-66       0
      66-68       0
      68-70       0
      70-72       0
      72-74       0
      74-76       0
      76-78       0
      78-80       0
      80-82       0
      82-84       0
      84-86       0
      86-88       0
      88-90       0
 TOTAL NUMBER OF SAMPLES =  242

      LMAX =  59
      L.1  =  59
      L1   =  57
      L10  =  51    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LTD, SPT ARENAS,HOTELS,ETC
      L50  =  43
      L90  =  39
      L99  =  37
      LMIN =  35

 TNI =  57.0
 LNP (GAUSSIAN) =  57.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  58.9       LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  47.2

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13     HOURLY INFORMATION         S-5  TIMBERCREST                              NOV  30 1973

HOUR =   12.00- 3.00             SHEET-13 (BARNES-BISHOP)
WEATHER =   R.H.=38, TEMP=67, WIND(S) 8MPH  BP=758 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,RESD, MIN=BIR=BIRDS,TRK,RAIL,LT AIRCRAFT  MED BK SM LD

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       1
       38-40      37
       40-42      70
       42-44      60
       44-46      29
       46-48      15
       48-50      12
       50-52       9
       52-54       3
       54-56       2
       56-58       1
       58-60       0
       60-62       0
       62-64       0
       64-66       0
       66-68       0
       68-70       0
       70-72       0
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  239

        LMAX =  57
        L.1  =  57
        L1   =  55
        L10  =  49   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
        L50  =  43
        L90  =  39
        L99  =  39
        LMIN =  37

TNI =  49.0
LNP (GAUSSIAN) =  54.7      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  54.3      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  45.2

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14     HOURLY INFORMATION         S-5  TIMBERCREST                            NOV  30 1973

HOUR =   13.00-14.00                SHEET-14 (BARNES-BISHOP)
WEATHER =   R.H.=36, TEMP=69, WIND(SSW) 8MPH BP=757 MM HG SKY=CLR  0
 SOURCES MAJ=AUTO,RESD, MIN=CYLE,TRK,LT AIRCRAFT,DOGS  MED BK SM MED VAR

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       1
       38-40      44
       40-42      67
       42-44      59
       44-46      31
       46-48      19
       48-50      12
       50-52       4
       52-54       1
       54-56       0
       56-58       1
       58-60       1
       60-62       1
       62-64       0
       64-66       0
       66-68       0
       68-70       0
       70-72       0
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  241

       LMAX =  61
       L.1  =  61
       L1   =  57
       L10  =  47   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC RFC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  43
       L90  =  39
       L99  =  39
       LMIN =  37

TNI =  41.0
LNP (GAUSSIAN) =  52.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  54.5      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  45.5

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15     HOURLY INFORMATION          S-5  TIMBERCREST                               NOV  30 1973

HOUR =   14.00-15.00               SHFET-15 (TINDELL-CHAMBERLA
WEATHER =   R.H.=31, TEMP=70, WIND(SSW) 3-6MPH  BP=757 MM HG SKY=CLR 0
 SOURCES  MAJ=MOWER  MIN=AUTO,TRK,RES-.,DOGS  LW BK SM MED VAR

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40      14
       40-42      44
       42-44      71
       44-46      57
       46-48      21
       48-50      22
       50-52       3
       52-54       1
       54-56       3
       56-58       3
       58-60       0
       60-62       1
       62-64       0
       64-66       0
       66-68       0
       68-70       0
       70-72       0
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  240

       LMAX =  61
       L.1  =  61
       L1   =  57
       L10  =  49   FHWA DESIGN LFVELS  60(PARKS) 70(RES.SCH.CHC.HOSP.PUBLIC REC AREAS.LIB. SPT ARENAS.HOTELS.ETC
       L50  =  43
       L90  =  41
       L99  =  39
       LMIN =  39

TNI =  43.0
LNP (GAUSSIAN) =  52.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  55.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  46.6

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16     HOURLY INFORMATION          S-5  TIMBERCREST                           NOV  30 1973

HOUR =    15.00-16.00              SHFET-16 (TINDELL-CHAMRFRLA
WEATHER =    R.H.=38, TEMP=69, W IND(SW) 2-5MPH  BP=756 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,DOGS,RESD, MIN=LT AIRCRAFT,TRK,BUS,COW, LW BK SM MED

        DRA     NUMBER OF OCCURRENCES
        30-32       0
        32-34       0
        34-36       0
        36-38       0
        38-40      42
        40-42      66
        42-44      54
        44-46      25
        46-48      22
        48-50      12
        50-52       5
        52-54       6
        54-56       3
        56-58       1
        58-60       3
        60-62       1
        62-64       1
        64-66       0
        66-68       0
        68-70       0
        70-72       0
        72-74       0
        74-76       0
        76-78       0
        78-80       0
        80-82       0
        82-84       0
        84-86       0
        86-88       0
        88-90       0
 TOTAL NUMRER OF SAMPLES =  241

        LMAX =  63
        L.1  =  63
        L1   =  59
        L10  =  49    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LT3, SPT ARENAS,HOTELS,ETC
        L50  =  43
        L90  =  39
        L99  =  39
        LMIN =  39

 TNI =  49.0
 LNP (GAUSSIAN) =  54.7      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  59.0       LNP=85 MAX FUR AIRCRAFT SUGGESTED
 LEQ =  47.6

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17     HOURLY INFORMATION          S-5  TIMBERCREST                                    NOV  30 1973

HOUR =   16.00-17.00                SHEET-17 (BARNES-TORRES)
WEATHER =   R.H.=36, TEMP=69, WIND(SSW) 4MPH  BP=756 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,DOGS,RESD. MIN=COW,TRK,LT AIRCRAFT. MED HK MNY LD VAR

        DBA     NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40       1
       40-42      15
       42-44      31
       44-46      51
       46-48      23
       48-50      31
       50-52      13
       52-54      19
       54-56      14
       56-58      17
       58-60       5
       60-62       5
       62-64       3
       64-66       5
       66-68       0
       68-70       0
       70-72       0
       72-74       1
       74-76       0
       76-78       0
       78-80       1
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  235

       LMAX =  79
       L.1  =  79
       L1   =  65
       L10  =  57     FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  47
       L90  =  43
       L99  =  41
       LMIN =  39

TNI =  69.0
LNP (GAUSSIAN) =  64.3      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  74.6      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  58.2

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18     HOURLY INFORMATION          S-5  TIMBERCREST                              NOV  30 1973

HOUR =    17.00-18.00                SHEET-18 (TORRES-HULSE)
WEATHER =    R.H.=42, TEMP=63, WIND(S) 0-1MPH  BP=756 MM HG  SKL=CLR  0
 SOURCES  MAJ=AUTO,CYCLE,DOGS,RESD, MIN=TRK,  MED BK MNY MED VAR

        DBA    NUMBER OF OCCURRENCES
       30-32      0
       32-34      0
       34-36      0
       36-38      0
       38-40      0
       40-42      0
       42-44     11
       44-46     38
       46-48     42
       48-50     62
       50-52     24
       52-54     22
       54-56      9
       56-58     14
       58-60     10
       60-62      4
       62-64      3
       64-66      0
       66-68      0
       68-70      0
       70-72      1
       72-74      0
       74-76      0
       76-78      0
       78-80      0
       80-82      0
       82-84      0
       84-86      0
       86-88      0
       88-90      0
TOTAL NUMBER OF SAMPLES =  240

       LMAX =  71
       L.1  =  71
       L1   =  63
       L10  =  57   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  49
       L90  =  45
       L99  =  43
       LMIN =  43

TNI =  63.0
LNP (GAUSSIAN) =  63.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  65.8      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  53.8

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19     HOURLY INFORMATION          S-5  TIMBERCREST                                    NOV  30 1973

HOUR =    18.00-19.00                SHEET-19 (SAYDJARI-HORTON)
WEATHER =   R.H.=50, TEMP=59, WIND=NIL  BP=757 MM HG  SKY=CLR   0
 SOURCES  MAJ=RESD,AUTO, MIN=CYCLE,DOGS,REC,LT AIRCRAFT, LW BK MNY MED V

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40       0
       40-42       0
       42-44       0
       44-46      15
       46-48      74
       48-50      63
       50-52      33
       52-54      24
       54-56       9
       56-58      10
       58-60       6
       60-62       1
       62-64       1
       64-66       2
       66-68       0
       68-70       0
       70-72       0
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  238

       LMAX =  65
       L.1  =  65
       L1   =  63
       L10  =  55    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  49
       L90  =  47
       L99  =  45
       LMIN =  45

TNI =  49.0
LNP (GAUSSIAN) =  58.1      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  61.8      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  52.3

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20     HOURLY INFORMATION          S-5  TIMBERCREST                        NOV  30 1973

HOUR =   19.00-20.00             SHEET-20 (SAYDJARI-MORTON)
WEATHER =   R.H.=74, TEMP=53, WIND=NIL  BP=757 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO MIN=DOGS,RES,CYCLE   LW AK HVY MED VAR

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40       0
       40-42       0
       42-44       3
       44-46      42
       46-48      67
       48-50      45
       50-52      30
       52-54      13
       54-56      12
       56-58       9
       58-60       1
       60-62      12
       62-64       8
       64-66       1
       66-68       1
       68-70       0
       70-72       1
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
TOTAL NUMBER OF SAMPLES =  245

       LMAX =  71
       L.1  =  71
       L1   =  65
       L10  =  57   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  49
       L90  =  45
       L99  =  43
       LMIN =  43

TNI =  63.0
LNP (GAUSSIAN) =  63.4      LNP=86 MAX FOR AIRCRAFT SUGGESTED
LNP =  68.2       LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  54.9

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21     HOURLY INFORMATION          S-5  TIMBERCREST                                     NOV  30 1973
HOUR =   20.00-21.00                  SHEET-21 (ALEXANDER-TORRES)
WEATHER =   R.H.=65, TEMP=55, WIND(SSW) 1MPH  BP=757 MM HG SKY=CLR  0
 SOURCES  MAJ=AUTO+CYCLE+DOGS, MIN=RAIL+TRK  MED RK HWY LD VAR

        DBA    NUMBER OF OCCURRENCES
       30-32      0
       32-34      0
       34-36      0
       36-38      0
       38-40      0
       40-42      0
       42-44      4
       44-46     26
       46-48     44
       48-50     52
       50-52     42
       52-54     21
       54-56     15
       56-58     12
       58-60     11
       60-62      5
       62-64      0
       64-66      2
       66-68      0
       68-70      0
       70-72      1
       72-74      0
       74-76      0
       76-78      0
       78-80      0
       80-82      0
       82-84      0
       84-86      0
       86-88      0
       88-90      0
 TOTAL NUMBER OF SAMPLES =  235

       LMAX =  71
       L.1  =  71
       L1   =  65
       L10  =  57    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  49
       L90  =  45
       L99  =  43
       LMIN =  43

 TNI =  63.0
 LNP (GAUSSIAN) =  63.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  65.7      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  54.2

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22     HOURLY INFORMATION          S-5  TIMBERCREST                                         NOV  30 1973
HOUR =   21.00-22.00                SHEET-22 (ALEXANDER-TORRES)
WEATHER =   R.H.=68, TEMP=52, WIND(S) 1MPH  BP=757 MM HG  SKY=CLR  0
 SOURCES  MAJ=AUTO,RES,REC, MIN=UOG,RAIL,CYCLE   HIGH BK MNY LD VAR

        DBA    NUMBER OF OCCURRENCES
       30-32       0
       32-34       0
       34-36       0
       36-38       0
       38-40       0
       40-42       0
       42-44       3
       44-46      33
       46-48      70
       48-50      54
       50-52      32
       52-54      16
       54-56       8
       56-58       9
       58-60       4
       60-62       4
       62-64       0
       64-66       0
       66-68       1
       68-70       3
       70-72       2
       72-74       0
       74-76       0
       76-78       0
       78-80       0
       80-82       0
       82-84       0
       84-86       0
       86-88       0
       88-90       0
 TOTAL NUMBER OF SAMPLES =  239

       LMAX =  71
       L.1  =  71
       L1   =  69
       L10  =  55   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
       L50  =  49
       L90  =  45
       L99  =  43
       LMIN =  43

 TNI =  55.0
 LNP (GAUSSIAN) =  60.7      LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LNP =  67.8        LNP=85 MAX FOR AIRCRAFT SUGGESTED
 LEQ =  55.5

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23     HOURLY INFORMATION          S-5  TIMBERCREST                           NOV  30 1973

HOUR =    22.00-23.00               SHEET-23 (ALEXANDER-HORTON)
WEATHER =    R.H.=74, TEMP=51, WIND(SSW) 2.5MPH  BP=757 MM HG SKY=CLR  0
 SOURCES  MAJ=AUTO.DOGS.RES. MIN=RAIL.CYCLE.TRK. MED BK MNY  LD VAR

        DBA    NUMBER OF OCCURRENCES
        30-32      0
        32-34      0
        34-36      0
        36-38      0
        38-40      0
        40-42      0
        42-44      5
        44-46     44
        46-48     62
        48-50     18
        50-52     36
        52-54     17
        54-56     18
        56-58      9
        58-60     13
        60-62     11
        62-64      8
        64-66      1
        66-68      0
        68-70      1
        70-72      2
        72-74      0
        74-76      0
        76-78      0
        78-80      0
        80-82      0
        82-84      0
        84-86      0
        86-88      0
        88-90      0
TOTAL NUMBER OF SAMPLES =  245

        LMAX =  71
        L.1  =  71
        L1   =  69
        L10  =  59   FHWA DESIGN LEVELS  60(PARKS) 70(RES.SCH.CHC.HOSP.PUBLIC REC AREAS.LIB. SPT ARENAS.HOTELS.ETC
        L50  =  49
        L90  =  45
        L99  =  43
        LMIN =  43

TNI =  71.0
LNP (GAUSSIAN) =  66.3      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  70.8       LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  56.1

****************************************************************************************************
```

```
24     HOURLY INFORMATION          S-5  TIMBERCREST                                        NOV  30 1973

HOUR =    23.00-24.00                   SHEET-24 (ALEXANDER-HORTON)
WEATHER =    R.H.=76, TEMP=50, WIND(SSW) 4MPH  BP=759 MM HG SKY=CLR  0
 SOURCES  MAJ=RAIL+AUTO+DOGS+RESU, MIN=CYCLE+TRK

          DBA     NUMBER OF OCCURRENCES
         30-32         0
         32-34         0
         34-36         0
         36-38         0
         38-40         0
         40-42         0
         42-44         0
         44-46        23
         46-48        63
         48-50        40
         50-52        41
         52-54        25
         54-56        16
         56-58         7
         58-60        12
         60-62         8
         62-64         5
         64-66         3
         66-68         0
         68-70         1
         70-72         0
         72-74         0
         74-76         0
         76-78         0
         78-80         0
         80-82         0
         82-84         0
         84-86         0
         86-88         0
         88-90         0
TOTAL NUMBER OF SAMPLES =  244

        LMAX =  69
        L.1  =  69
        L1   =  65
        L10  =  59    FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC AREAS,LIB, SPT ARENAS,HOTELS,ETC
        L50  =  49
        L90  =  47
        L99  =  45
        LMIN =  45

TNI =  65.0
LNP (GAUSSIAN) =  63.4      LNP=85 MAX FOR AIRCRAFT SUGGESTED
LNP =  67.2          LNP=85 MAX FOR AIRCRAFT SUGGESTED
LEQ =  54.7

******************************************************************************************
```

```
11          DAILY INFORMATION          S-5  TIMBERCREST                    NOV  30 1973
        DBA     NUMBER OF OCCURRENCES
        30-32       0
        32-34       0
        34-36       2
        36-38       8
        38-40     171
        40-42     340
        42-44     486
        44-46     824
        46-48     992
        48-50     893
        50-52     818
        52-54     562
        54-56     257
        56-58     161
        58-60      95
        60-62      78
        62-64      36
        64-66      17
        66-68       4
        68-70       7
        70-72      10
        72-74       1
        74-76       0
        76-78       0
        78-80       1
        80-82       0
        82-84       0
        84-86       0
        86-88       0
        88-90       0

  TOTAL NUMBER OF SAMPLES = 5763

        LMAX =  79
        L.1  =  71
        L1   =  63
        L10  =  55   FHWA DESIGN LEVELS  60(PARKS) 70(RES.SCH.CHC.HOSP.PUBLIC REC AREAS.LIB. SPT ARENAS.HOTELS.ETC
        L50  =  49
        L90  =  43
        L99  =  39
        LMIN =  35

  TNI =  61.0
  LEQ =  53.0
 LDN BASED ON 15 DAYTIME HOURS AND  9 NIGHTTIME HOURS
  LDN =  59.3        55 IS EPA IDENT.INTERFERENCE LEVEL.  75 IS EPA IDENT.HEARING PROT. LEVEL
  LNP =  65.9       LNP=85 MAX FOR AIRCRAFT SUGGESTED

*********************************************************************************************
   EXCEEDS 81 DBA   0.00 PERCENT OF THE TIME    4.2 PERCENT (24HR) NOT ACCEPTABLE (HUD)
   EXCEEDS 75 DBA    .02 PERCENT OF THE TIME   33.3 PERCENT (24HR) STRONGLY DISCOURAGED (HUD)
   EXCEEDS 65 DBA    .40 PERCENT OF THE TIME   33.3 PERCENT (24HR) NORMALLY UNACCEPTABLE (HUD)
   EXCEEDS 45 DBA  82.53 PERCENT OF THE TIME   33.3 PERCENT (24HR) NORMALLY   ACCEPTABLE (HUD)
*********************************************************************************************
     CORRELATION BET L1  AND LAV=   .938
     CORRELATION BET L50 AND LAV=   .748
     CORRELATION BET L50 AND L10=   .723
```

APPENDIX H

COMPUTER PROGRAM FOR CLASSIFIER DATA REDUCTION AND SAMPLE OUTPUT

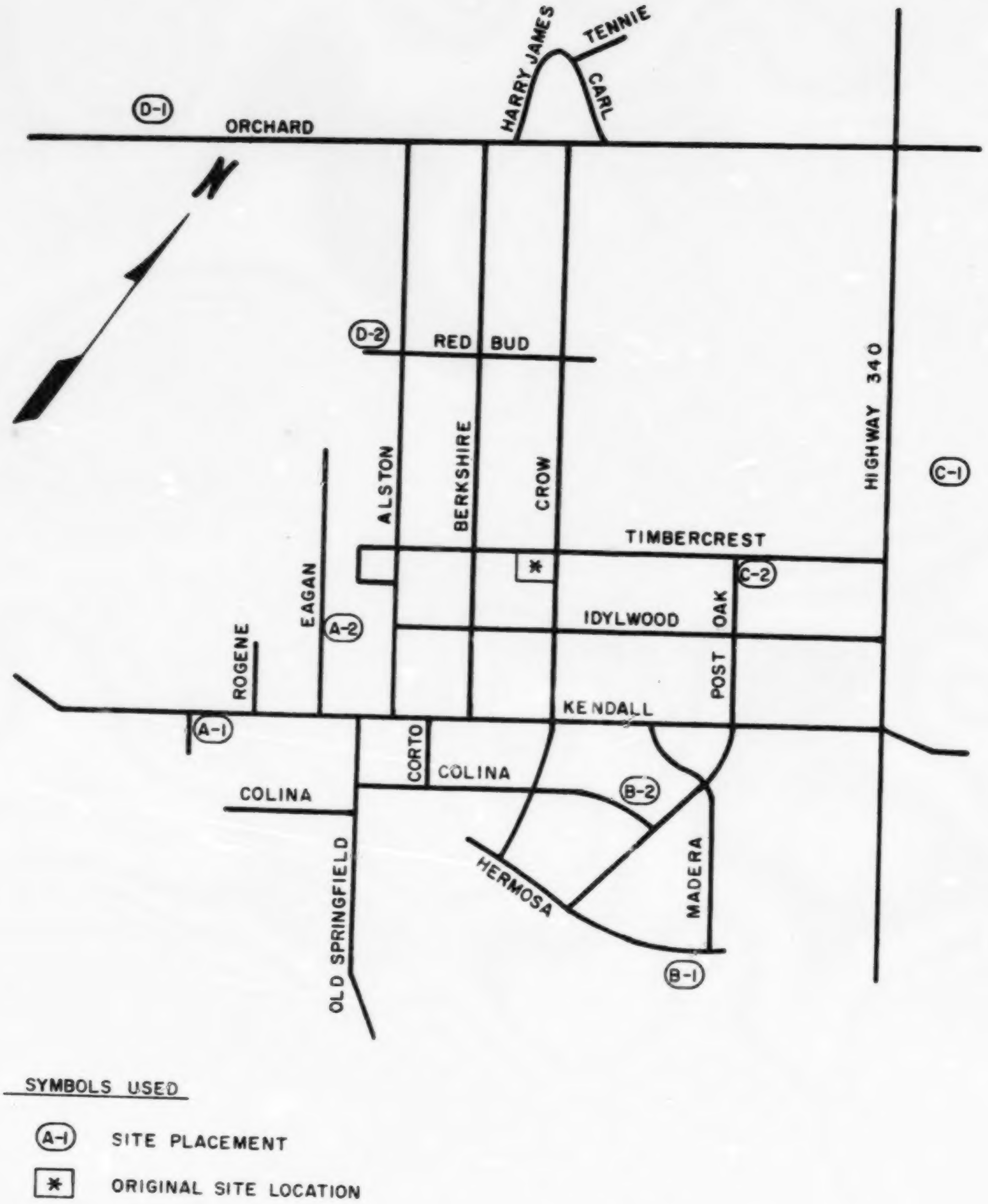
```
      PROGRAM MAIN(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION  ENVIR(12),SITE(10),NDB(30),NDBA(30),LDB(35),LDBA(35),
     1AAL(6),JAL(6),CASE(5),SOURCE(12),ADB(30) ,ADBA(30) ,CORT(4)
      REAL       LDN,LNP,LUM,LUMM,NPL,LMIN,LMAX,JAL,MMAX,MMIN
C     THIS PROGRAM IS GOOD FOR             CLASSIFIER DATA ONLY
      KKK=22
      LLL=KKK+6
      READ 9,  NDAYS
    9 FORMAT(I5)
      READ 8,     (CORT(I),I=1,4)
    8 FORMAT(4A5)
      NDAY=1
 2000 CONTINUE
      WRITE(6,73)
      READ 10,  NCASES,(SITE(I),I=1,10),MON,DAY,YEAR
   10 FORMAT(1X,I4,10A5,3A4)
      WRITE (6,50)
   50 FORMAT(100H************************************************************
     1****************************************)
      WRITE(6,74)
      WRITE (6,51)  (SITE(I),I=1,10)
   51 FORMAT (3X,7HSITE = ,10A5/)
      WRITE (6,52) MON,DAY,YEAR,NCASES
   52 FORMAT(3X,7HDATE = ,3A4,15X,8HSHEETS =,I4)
      WRITE(6,7 )
      WRITE (6,50)
      DO 99 M=1,LLL
      LDB(M)=0
      LDBA(M)=0
   99 CONTINUE
      DO 100 M=1,KKK
      NDBA(M)=0
  100 CONTINUE
      TALSUM=0.
      KSUM=0
      MMAX=0.
      MMIN=500.
      NCASE=1
      KDAY=0
      NIGHT=0
 1000 CONTINUE
      WRITE(6,72)
      WRITE (6,60)  NCASE, (SITE(I),I=1,10),MON,DAY,YEAR
   60 FORMAT(2X,I3,5X,18HHOURLY INFORMATION,5X,10A5,3A4/)
      READ 12,TS,ISUM,(CASE(I),I=1,5)
   12 FORMAT (2X,F5.2,2X,I5,5A6)
      ITS=TS
      DIF=(TS-ITS)*100./60.+ISUM/600.
      TSS=ITS+DIF
      ITSS=TSS
      TF=ITSS+(TSS-ITSS)*60./100.
      READ 13,  (ENVIR(I),I=1,12)
   13 FORMAT (12A6)
C     READ IN DESCRIPTION OF SOURCES
      READ 980,(SOURCE(I),I=1,12)
  980 FORMAT(12A6)
C        READ IN NUMBER OF SAMPLES
```

```
      READ 14, (NDH(N),N=1,KKK)
   14 FORMAT (14(1X,I4)/ 10(1X,I4))
      WRITE (6,61)  TS,TF ,(CASE(I),I=1,5),(CORT(I),I=1,4)
   61 FORMAT(3X,6HHOUR =,3X,F5.2,1H-,F5.2,10X,5A6,7X,4A5)
      WRITE (6,62)  (ENVIR(I),I=1,12)
   62 FORMAT(3X,9HWE THER =,2X,12A6)
      WRITE(6,981) (SOURCE(I),I=1,1 )
  981 FORMAT(3X,12A6/)
      WRITE (6,63)
   63 FORMAT(11X,3HDBA,4X,22HTIME IN BINS (MINUTES))
C          PRINT OUT AMPLITUDE DISTRIBUTION
      LSUM=0
      DO 98 N =1,KKK
      IDUMS=(N-1)*5/2
      NS=45+IDUMS
      IDUMT=N*5/2
      NT=45+IDUMT
      IF(NDB(N).LE.0)  NDB(N)=0
      ADB(N)= NDB(N)/10.
      WRITE (6,71)  NS,NT,ADB(N)
      LSUM=LSUM+NDB(N)
   98 CONTINUE
   71 FORMAT (10X,I2,1H-,I2,2X,F5.1)
   72 FORMAT(1X,3H    )
   73 FORMAT(1H )
C     FIND TOTAL NUMBER OF SAMPLES FOR THE HOUR
      ALSUM=LSUM/10.
      TALSUM=TALSUM+ALSUM
      TIME=ISUM/10.
      WRITE(6,95)  TIME
   95 FORMAT(3X,24HTOTAL TIME OF SAMPLING =,F7.1)
      TBELO=TIME-ALSUM
      WRITE (6,11)   TBELO
   11 FORMAT(3X,24HTIME IN BINS BELOW 45DB=,F7.1)
      WRITE (6,75)  ALSUM
   75 FORMAT(3X,24HTOTAL TIME IN BINS =,F7.1/)
C          FIND PERCENT OF TOTAL
      AAL(1)=.001*ISUM
      AAL(2)=0.01*ISUM
      AAL(3)=00.1*ISUM
      AAL(4)=  .5*ISUM
      AAL(5)=  .9*ISUM
      AAL(6)= .99*ISUM
C               SEARCH FOR LMIN
C            SEARCH FOR LMAX
      DO 703 N =1,KKK
      MPP=KKK-N+1
      IF(NDB(MPP)-1)  703,705,705
  705 CONTINUE
      LMAX=45.+(MPP-1.)*5./2.
      GO TO 706
  703 CONTINUE
C              CALCULATE LN*S
  706 CONTINUE
      DO 102 MM=1,6
      ISUB=0
      DO 707 NN =1,KKK
      KK=KKK-NN+1
      ISUB=NUB(KK)+ISUB
      IF(ISUB-AAL(MM))  716,708,708
  708 CONTINUE
      JAL(MM)=46.+(KK-1.)*2.5
      GO TO 102
  716 CONTINUE
      IF(ISUB.LT.LSUM)   GO TO 707
      JAL(MM)=43.5
      GO TO 102
  707 CONTINUE
  102 CONTINUE
C   CALCULATE LNP (GAUSSIAN) AND TNI
      DD=JAL(3)-JAL(5)
      NPL=JAL(4)+DD+DD*DD/60.
      TNIH=4.*DD+(JAL(5)-30.)
C             CONTROL FOR NIGHTTIME PENALTY
      IF(TF.LT.7..OR.TF.GT.22.)  GO TO 521
      KDAY=KDAY+1
      DO 116 I=1,KKK
      LDB(I)=NDB(I)
  116 CONTINUE
      GO TO 525
  521 CONTINUE
C           APPLY 10DB PENALTY FOR NIGHT
      NIGHT=NIGHT+1
      DO 115 KL=1,KKK
      LP=KL+4
      LDB(LP)=NDB(KL)
  115 CONTINUE
  525 CONTINUE
C         SUMMATION OF NUMBER OF SAMPLES FOR THE DAY
      DO 105 JJ=1,KKK
      NDBA(JJ)=NDB(JJ)+NDBA(JJ)
      LDBA(JJ)=LDB(JJ)+LDBA(JJ)
  105 CONTINUE
      KSUM=KSUM+ISUM
C       PRINT OUT LN#S,TNI AND LNP (GAUSSIAN)
      WRITE (6,804)
  804 FORMAT(2X,47HNOTE - ANY DATA BELOW 45DB IS ASSUMED AS 43.5DB)
      WRITE (6,72)
      WRITE (6,76) LMAX
      WRITE (6,77)  JAL(1)
      WRITE (6,78)  JAL(2)
      WRITE (6,79)  JAL(3)
      WRITE (6,80)  JAL(4)
      WRITE (6,81)  JAL(5)
      WRITE (6,82)  JAL(6)
      IF(TBELO-0.)    715,715,700
  700 CONTINUE
      LMIN=43.5
      WRITE (6,103)
  103 FORMAT(4X,22HLMIN IS LESS THAN 45DB)
      GO TO 702
  715 CONTINUE
      DO 704 N =1,KKK
      IF(NDB(N)-1)  704,701,701
      701 CONTINUE
          LMIN=40.+(N-1.)*5./2.
          WRITE(6,83)  LMIN
          GU TO 7 2
      704 CONTINUE
      702 CONTINUE
       76 FORMAT(10X,7HLMAX = ,F5.1)
       77 FORMAT (10X,7HL.1  = ,F5.1)
       78 FORMAT(10X,7HL1    = ,F5.1)
       79 FORMAT(10X,7HL10  = ,F5.1,
         190H   FHWA DESIGN LEVELS  60(PARKS) 70(RES,SCH,CHC,HOSP,PUBLIC REC
         2 AREAS,LIB, SPT ARENAS,HOTELS,ETC)
       80 FORMAT (10X,7HL50  = ,F5.1)
       81 FORMAT (10X,7HL90  = ,F5.1)
       82 FURMAT (10X,7HL99  = ,F5.1)
       83 FORMAT (10X,7HLMIN = ,F5.1/)
       84 FORMAT (3X,6HTNI = ,F5.1)
       85 FORMAT(3X,17HLNP (GAUSSIAN) = ,F5.1,5X
         1,34H LNP=85 MAX FOR AIRCRAFT SUGGESTED)
          WRITE(6,72)
          WRITE (6,84)  TNIH
          WHITE (6,85)  NPL
          IF(LMAX.GT.MMAX)  MMAX=LMAX
          IF(LMIN.LT.MMIN)  MMIN=LMIN
C               COMPUTE LAV AND MEAN
          VE=0.
          UNN=0.
          DU 106 LL =1,KKK
          PRR=46.+2.5*(LL-1.)
          PP=0.1*PRR
          DR=NDB(LL)
          XPO=DR/ISUM
          UN=XPO*10.**PP
          UNN=UN+UNN
          VER=XPO*PRR
          VE=VE+VER
      106 CONTINUE
          UN=TBELO*10.**4.35/TIME
          UNN=UNN+UN
          VER=TBELO*43.5/TIME
          VE=VE+VER
          AV=10.*ALOG10(UNN)
C               COMPUTE SIGMA AND LNP
          DQQ=0.
          DU 107 LL =1,KKK
          FN=ABS(46.+2.5*(LL-1.)-VE)
          DQ=FLOAT(NDB(LL))*FN*FN/FLOAT(ISUM)
          DQQ=DQ+DQQ
      107 CUNTINUE
          FN=ABS(43.5-VE)
          DQ=TBELO*FN*FN/TIME
          DQQ=DQ+DQQ
          SIG=SQRT(DQQ)
          LNP=AV+2.56*SIG
          WRITE(6,89)  LNP
          WHITE(6,87)  AV
       91 FURMAT(3X,6HLAV = ,F5.1)
      WRITE (6,72)
      WRITE (6,50)
      WRITE(6,73)
      NCASE=NCASE+1
      IF(NCASE.LE.NCASES)  GO TO 1000
C
C         START CALCULATIONS FOR THE WHOLE DAY
C                FIND PERCENT OF TOTAL
C
      AKSUM=KSUM/10.
      TTBEL=AKSUM-TALSUM
      IALSUM=TALSUM*10
      AAL(1)=.001*KSUM
      AAL(2)=0.01*KSUM
      AAL(3)=  .1*KSUM
      AAL(4)=  .5*KSUM
      AAL(5)=  .9*KSUM
      AAL(6)= .99*KSUM
C        CALCULATE THE LN#S AND TNI
      DO 108 MN=1,6
      JSUB=0
      DO 709 NM =1,KKK
      KK=KKK-NM+1
      JSUB=NUBA(KK)+JSUB
      IF(JSUB-AAL(MN))    717,710,710
  710 CONTINUE
      JAL(MN)=46.+(KK-1.)*2.5
      GO TO 108
  717 CONTINUE
      IF(JSUB.LT.IALSUM)    GO TO 709
      JAL(MN)=43.5
      GO TO 108
  709 CONTINUE
  108 CONTINUE
      TNID=4.*(JAL(3)-JAL(5))+(JAL(5)-30.)
C              COMPUTE LAV AND MEAN
      AVE=0.
      DUNN=0.
      DO 111 LL=1,KKK
      POR=46.+2.5*(LL-1.)
      POM=0.1*POR
      DBA=NDBA(LL)
      EXPR=DBA/KSUM
      DUN=EXPR*10.**POM
      DUNN=DUNN+DUN
      AVER=EXPR*POR
      AVE=AVE+AVER
  111 CONTINUE
      DUN=TTBEL*10.**4.35/AKSUM
      DUNN=DUNN+DUN
      AVER=TTBEL*43.5/AKSUM
      AVE=AVE+AVER
      AAVER=10.*ALOG10(DUNN)
C               COMPUTE LDN
      LUMM=0.
      DO 119 LL=1,LLL
      PDN=0.1*(46.+2.5*(LL-1.))
      DBAL=LDBA(LL)
      EDN=DBAL/KSUM
      LUM=EDN*10.**PDN
      LUMM=LUM+LUMM
  119 CONTINUE
      LUM=TTBEL*10.**4.35/AKSUM
      LUMM=LUMM+LUM
      LUN=10.*ALOG10(LUMM)
C          FIND SIGMA AND LNP
      SSQQ=0.
      DO 120 LL=1,KKK
      FN=ABS(46.+5.5*(LL-1.)-AVE)
      SSQ=FLOAT(NDBA(LL))*FN*FN/FLOAT(KSUM)
      SSQQ=SSQ+SSQQ
  120 CONTINUE
      FN=ABS(43.5-AVE)
      SSQ=TTBEL*FN*FN/AKSUM
      SSQQ=SSQQ+SSQ
      SIGMA=SQRT(SSQQ)
      LNP=AAVER+2.56*SIGMA
      WRITE (6,72)
      WRITE(6,86)  NDAY,(SITE(I),I=1,10),MON,DAY,YEAR,(CORT(I),I=1,4)
   86 FORMAT(1X,I3,10X,17HDAILY INF RMATION,5X,10A5,3A4,4A5/)
      WRITE (6,63)
C   PRINT OUT AMPLITUDE DIST*IBUTION FOR THE DAY
      DO 97 N =1,KKK
      IDUMS=(N-1)*5/2
      NS=45+IDUMS
      NT=45+N*5/2
      ADBA(N)=NDBA(N)/10.
      WRITE (6,71)  NS,NT,ADBA(N)
   97 CONTINUE
      WRITE (6,95)   AKSUM
      WRITE (6,75)   TALSUM
      WRITE(6,11)   TTBEL
      WRITE (6,72)
      WRITE (6,804)
      WRITE (6,72)
      WRITE (6,76)  MMAX
      WRITE (6,77)  JAL(1)
      WRITE (6,78)  JAL(2)
      WRITE (6,79)  JAL(3)
      WRITE (6,80)  JAL(4)
      WRITE (6,81)  JAL(5)
      WRITE (6,82)  JAL(6)
      WRITE (6,83)  MMIN
      WRITE (6,84)   TNID
      WRITE(6,87)  AAVER
      WRITE(6,90)  KDAY,NIGHT
      WRITE (6,88)  LDN
      WRITE (6,89)  LNP
      WRITE (6,72)
   87 FORMAT(3X,6HLEQ = ,F5.1)
   88 FORMAT(3X,6HLDN = ,F5.1,5X,
     17*H  55 IS EPA IDENT.INTERFERENCE LEVEL.  75 IS EPA IDENT.HEARING
     2PROT. LEVEL)
   89 FORMAT(3X,6HLNP = ,F5.1,5X
     1,34H LNP=85 MAX FOR AIRCRAFT SUGGESTED)
   90 FORMAT(2X,13HLDN BASED ON ,I2,19H DAYTIME HOURS AND ,I2,16H NIGHTTIME HOUR
     1IME HOURS)
      WRITE (6,50)
      EX81=0.
      EX75=0.
      EX65=0.
      EL45=0.
      DO 711 J=16,KKK
      EX81=NDBA(J)+EX81
  711 CONTINUE
      PG81=EX81/KSUM*100.
      DO 712 J =13,15
      EX75=EX75+NDBA(J)
  712 CONTINUE
      PG75=(EX81+EX75)/KSUM*100.
      DO 713 J = 9,12
      EX65=NDBA(J)+EX65
  713 CONTINUE
      PG65=(EX81+EX75+EX65)/KSUM*100.
      PL65=100.-PG65
      PL45=TALSUM*100./AKSUM
      WRITE(6,92)  PG81
      WRITE(6,93)  PG75
      WRITE(6,94)  PG65
      WRITE(6,96)  PL45
   92 FORMAT(3X,15HEXCEEDS 82 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     140H 4.2 PERCENT (24HR) NOT ACCEPTABLE (HUD))
   93 FORMAT(3X,15HEXCEEDS 75 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     147H 33.3 PERCENT (24HR) STRONGLY DISCOURAGED (HUD))
   94 FORMAT(3X,15HEXCEEDS 65 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     148H 33.3 PERCENT (24HR) NORMALLY UNACCEPTABLE (HUD))
   96 FORMAT(3X,15HEXCEEDS 45 DBA ,F6.2,20H PERCENT OF THE TIME,3X,
     148H 33.3 PERCENT (24HR) NORMALLY   ACCEPTABLE (HUD))
      WRITE (6,50)
      NDAY=NDAY+1
      IF(NDAY.LE.NDAYS)  GO TO 2000
C                                          REPLACE THE ACCOUNT CARD
      END
```

```
********************************************************************************************
  SITE =   S-5  TIMRERCREST

  DATF = DEC   1 1973                SHEETS =   1
********************************************************************************************
   1     HOURLY INFORMATION      S-5  TIMRERCREST                            DEC   1 1973

  HOUR =   13.00-13.43               R1-A                                TAPE DATA
  WEATHER =

         DBA    TIME IN BINS (MINUTES)
        45-47    6.1
        47-50    3.2
        50-52     .9
        52-55    1.3
        55-57     .9
        57-60     .8
        60-62     .1
        62-65     .1
        65-67     .1
        67-70    0.0
        70-72    0.0
        72-75    0.0
        75-77    0.0
        77-80    0.0
        80-82    0.0
        82-85    0.0
        85-87    0.0
        87-90    0.0
        90-92    0.0
        92-95    0.0
        95-97    0.0
        97-**    0.0
  TOTAL TIME OF SAMPLING =   43.0
  TIME IN BINS RELOW 45DB=   29.5
  TOTAL TIME IN BINS =   13.5

 NOTE - ANY DATA RELOW 45DB IS ASSUMED AS 43.5DB

        LMAX =  66.0
        L.1  =  66.0
        L1   =  58.5
        L10  =  48.5   FHWA DESIGN LEVELS  60(PARKS) 70(RES.SCH.CHC.HOSP.PUBLIC REC AREAS.LIB. SPT ARENAS.HOTELS.ETC
        L50  =  43.5
        L90  =  43.5
        L99  =  43.5
   LMIN IS LESS THAN 45DB

  TNI =  33.5
  LNP (GAUSSIAN) =  48.9      LNP=85 MAX FOR AIRCRAFT SUGGESTED
  LNP =  58.7      LNP=85 MAX FOR AIRCRAFT SUGGESTED
  LEQ =  48.7

********************************************************************************************
```

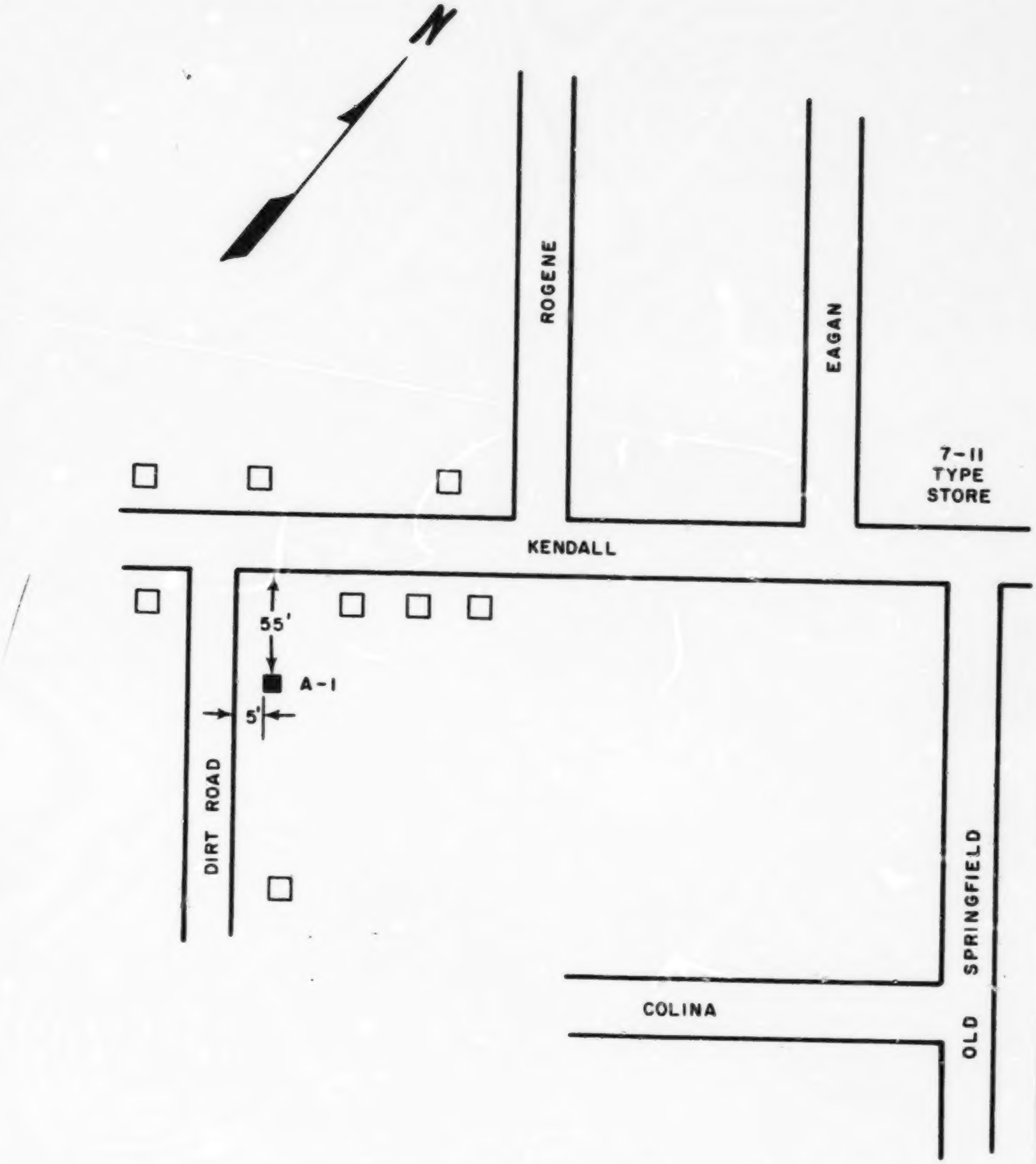
APPENDIX I

MAPS OF THE SPATIAL SAMPLING SITES

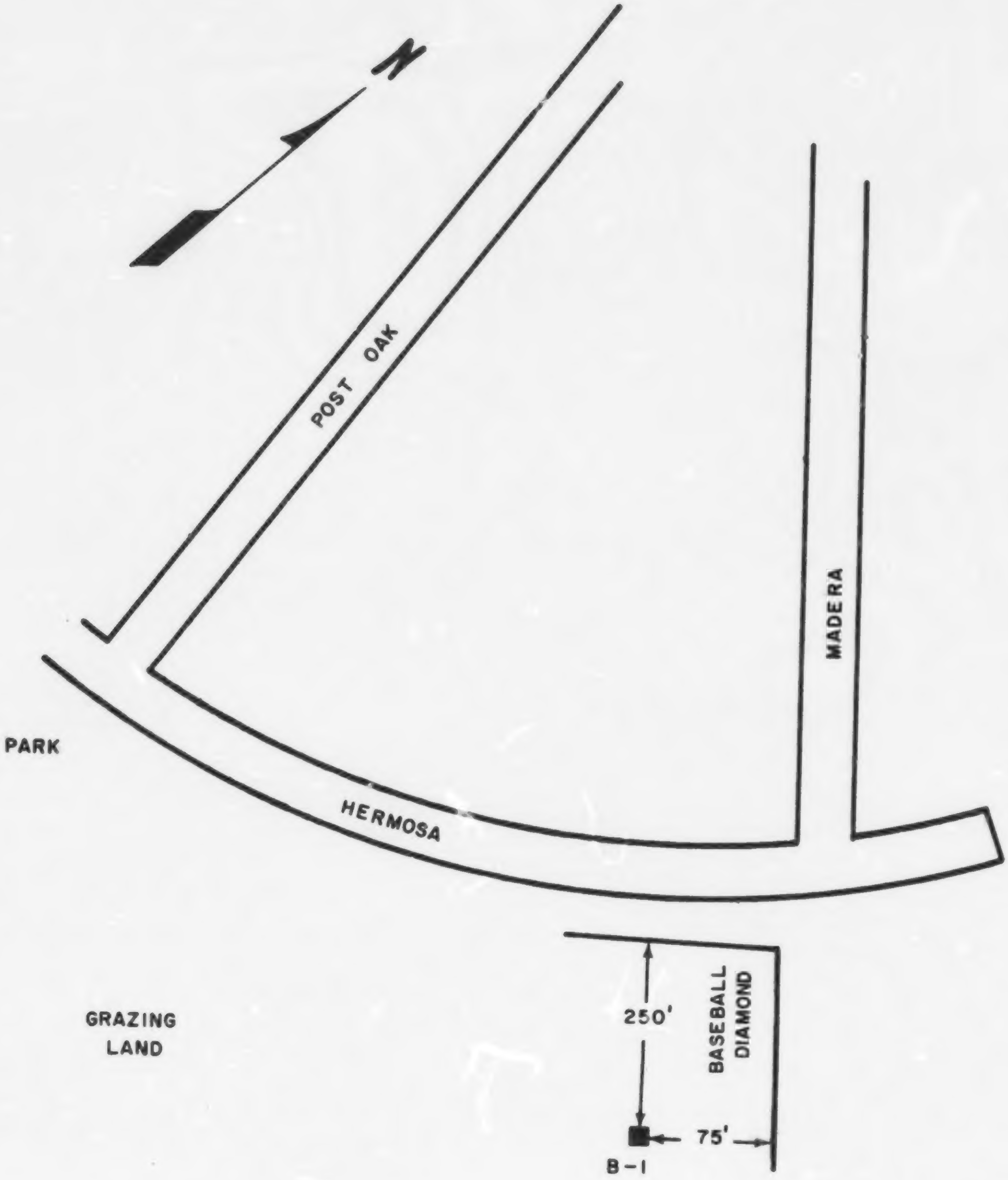


S – 5 TIMBERCREST

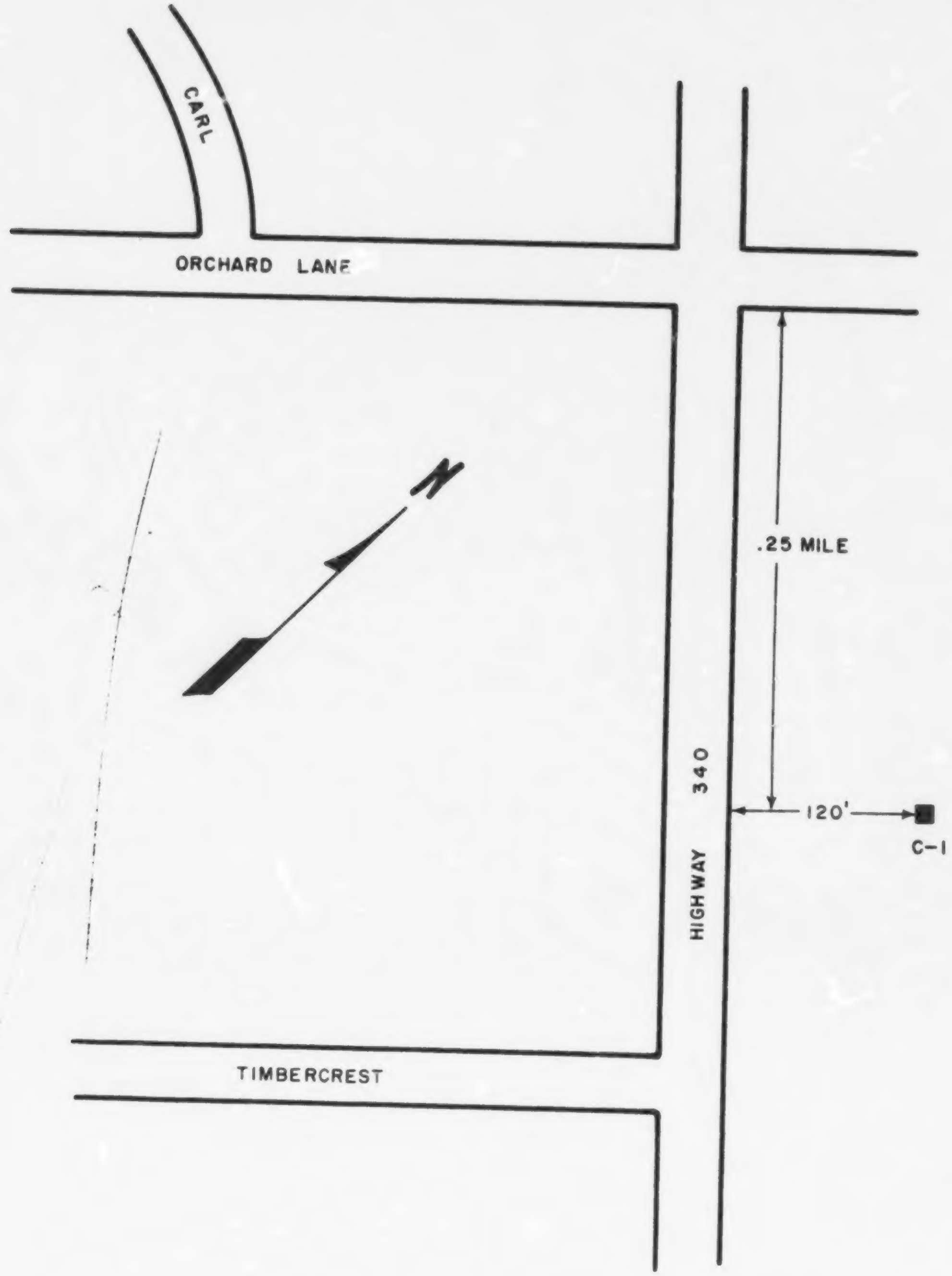
239<


N
ROGENE
EAGAN
7-11
TYPE
STORE
KENDALL
55'
A-1
5'
DIRT ROAD
SPRINGFIELD
OLD
COLINA

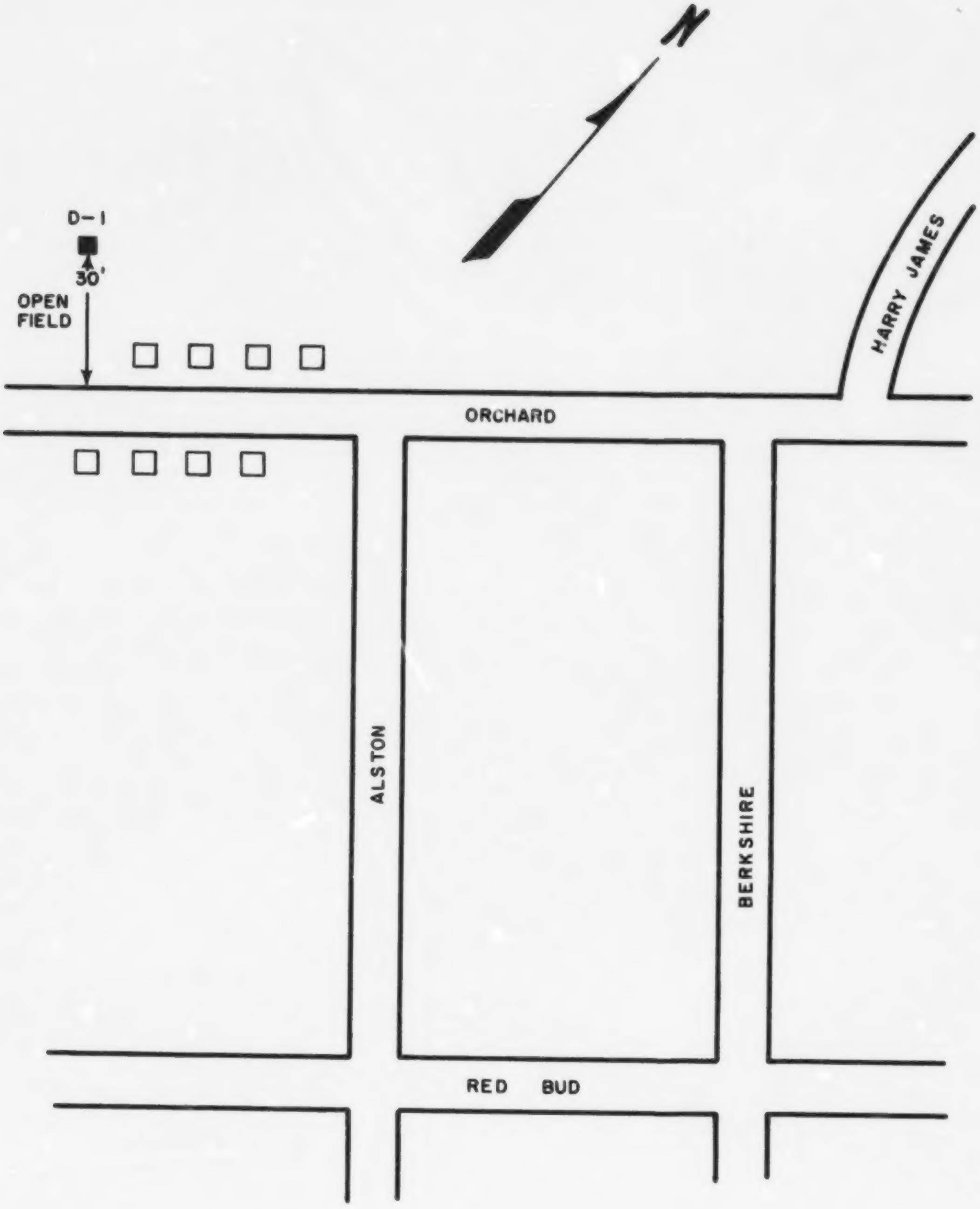
SITE A-1


N
POST OAK
MADERA
PARK
HERMOSA
GRAZING LAND
250'
BASEBALL DIAMOND
75'
B-1

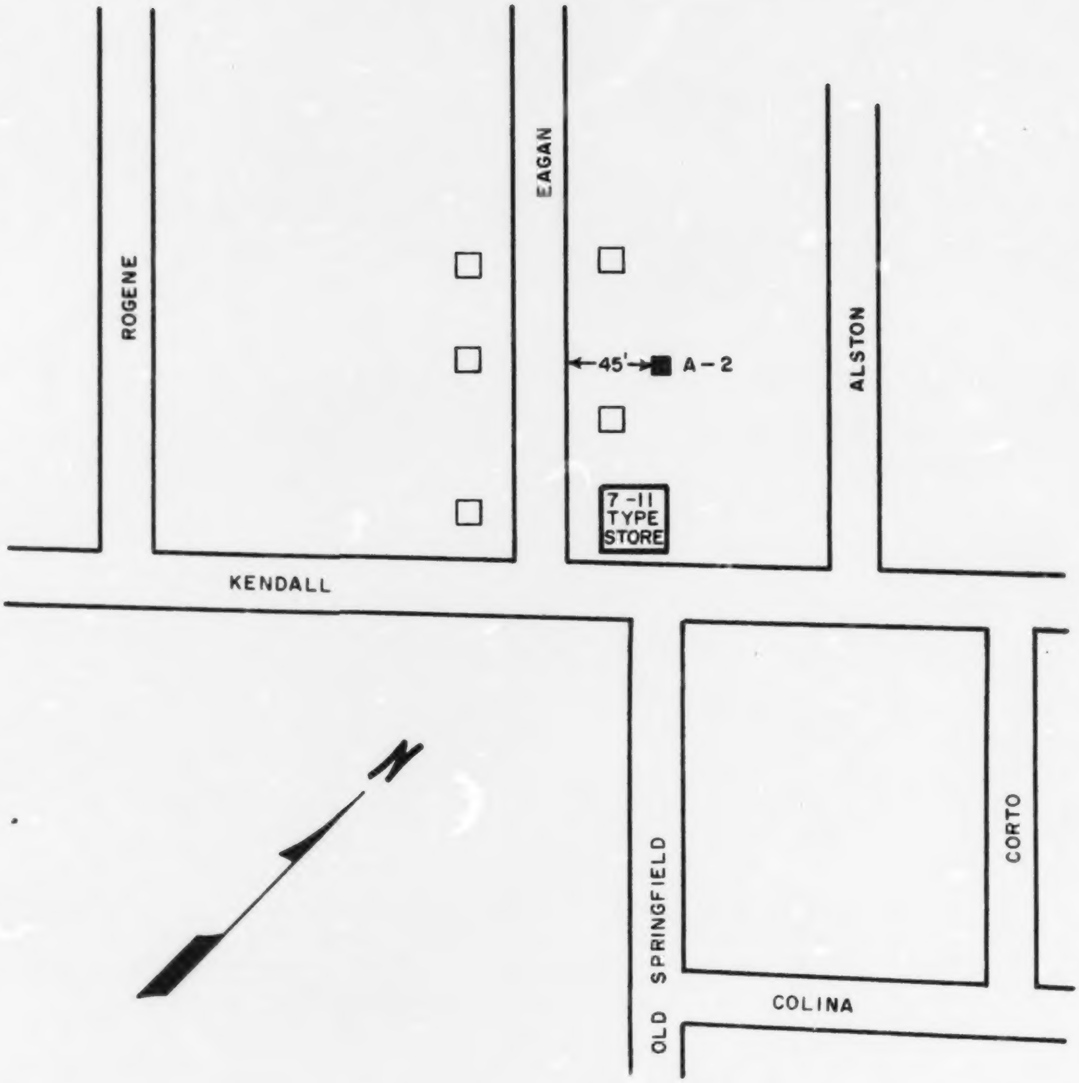
SITE B-1



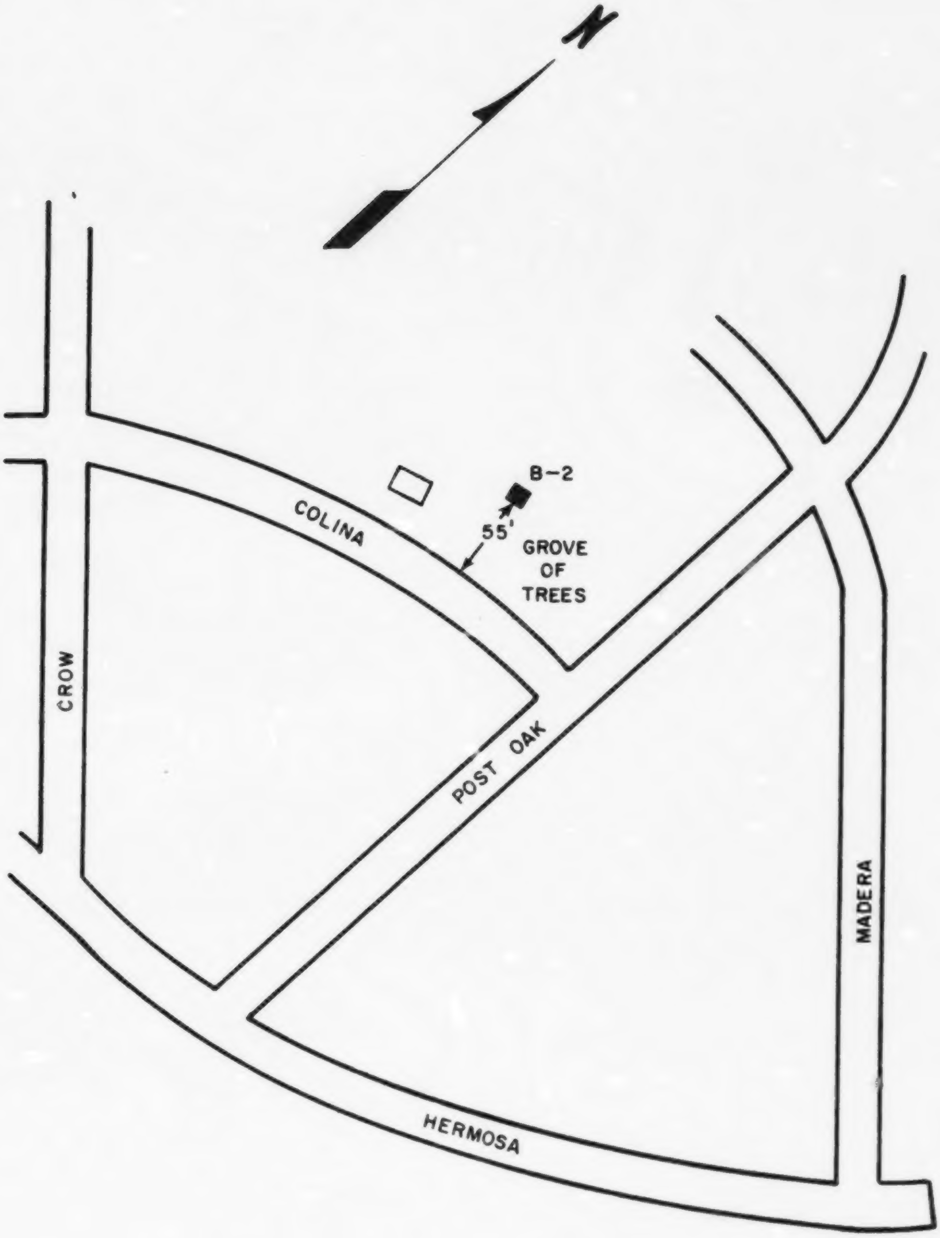
SITE C-1 242<


N
D-1
30'
OPEN FIELD
HARRY JAMES
ORCHARD
ALSTON
BERKSHIRE
RED BUD

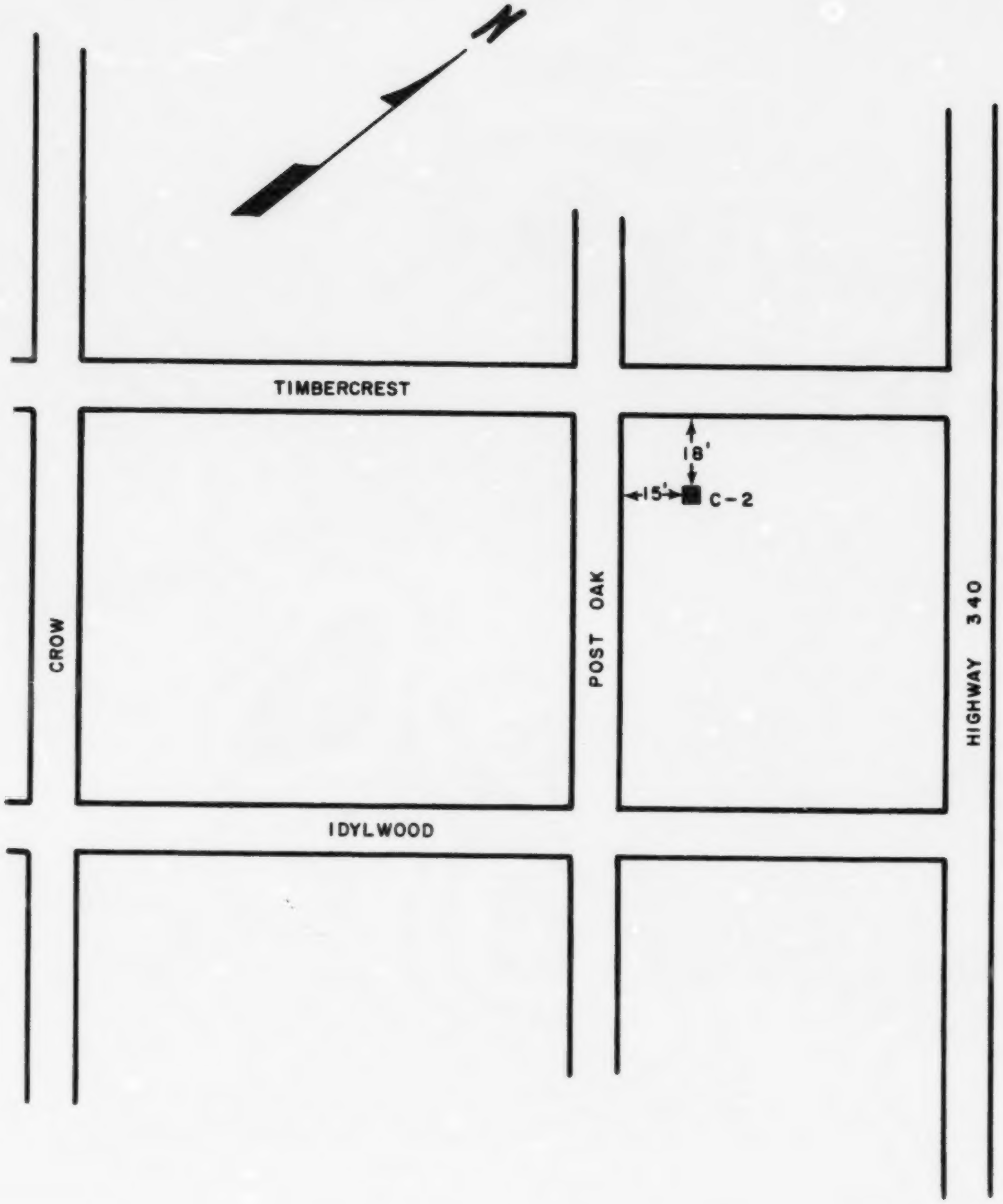
SITE D-1 243<


EAGAN
ROGENE
ALSTON
45'
A-2
7-11
TYPE
STORE
KENDALL
N
OLD SPRINGFIELD
CORTO
COLINA

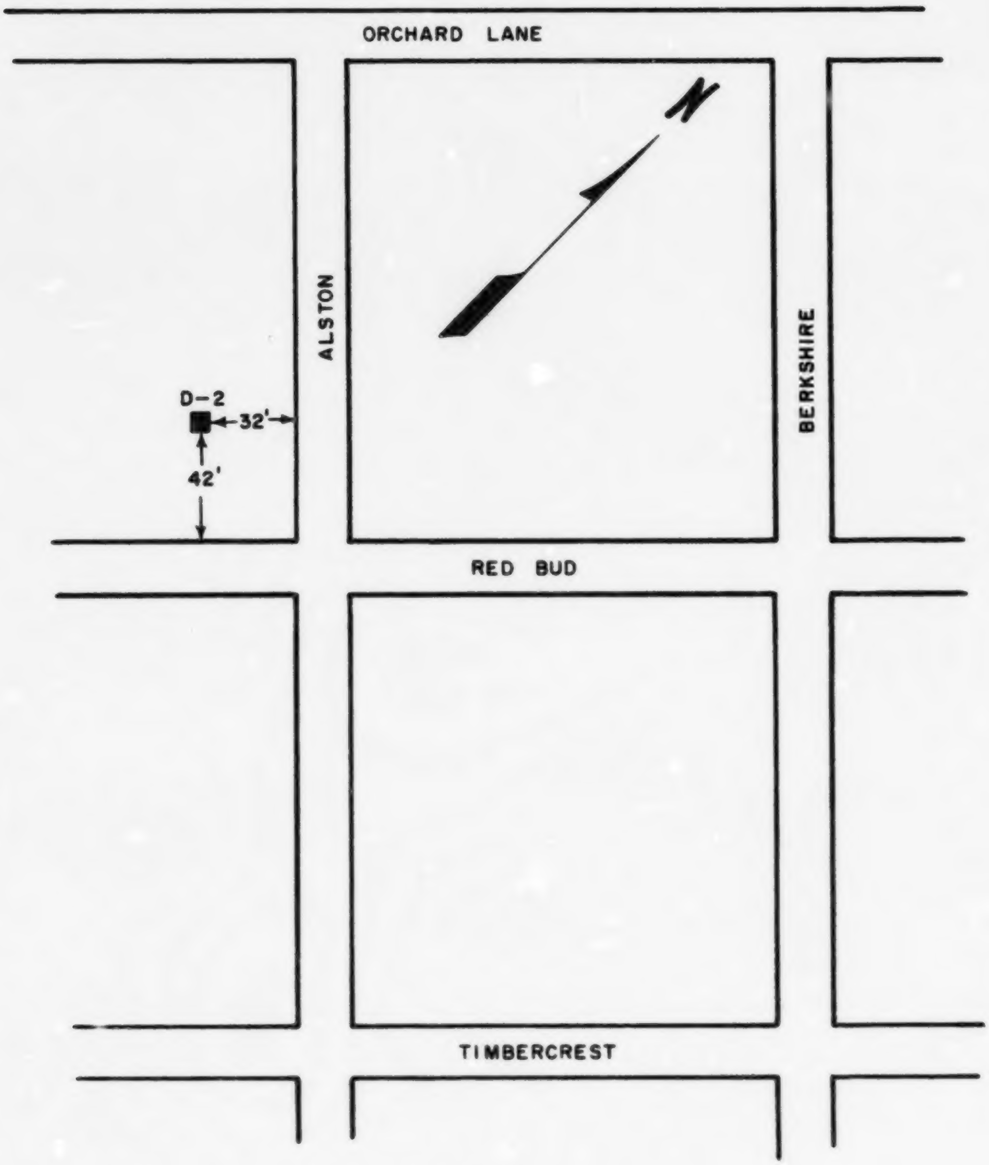
SITE A-2



SITE B-2



SITE C-2


ORCHARD LANE
N
ALSTON
BERKSHIRE
D-2
32'
42'
RED BUD
TIMBERCREST

SITE D-2

WACO, TEXAS AIRPORT WEATHER STATION

HOURLY OBSERVATIONS

November 29, 1973

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 KNOTS WIND		TENTHS OF SKY
1200	29.800	34	66	14	04	0
1300	29.840	19	71	20	10	0
1400	29,820	19	73	21	09	0
1500	29.800	19	72	18	07	0
1600	29.790	21	70	18	09	0
1700	29.790	34	65	18	07	0
1800	29.795	42	60	17	08	0
1900	29.810	46	59	17	07	0
2000	29.815	49	57	18	04	0
2100	29.830	57	52	18	08	0
2200	29.835	59	50	19	07	0
2300	29.835	56	51	19	08	0
2400	29.830	52	51	19	08	0

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WACO, TEXAS AIRPORT WEATHER STATION

HOURLY OBSERVATIONS

November 30, 1973

	IN. HQ.	PERCENT	°F	360	KNOTS	TENTHS
TIME	PRESSURE	R. H.	TEMP.	WIND		OF SKY
0100	29.830	54	50	19	08	0
0200	29.820	56	49	19	08	6
0300	29.820	60	47	19	07	0
0400	29.830	68	44	20	08	0
0500	29.830	73	43	19	08	0
0600	29.840	68	44	18	08	0
0700	29.850	73	43	18	10	0
0800	29.850	65	47	19	08	0
0900	29.860	56	52	19	10	0
1000	29.870	49	60	19	13	0
1100	29.870	41	65	19	13	0
1200	29.840	32	69	19	12	0
1300	29.820	31	71	18	12	0
1400	29.790	34	72	17	15	0
1500	29.780	38	72	17	14	0
1600	29.785	45	70	17	13	0
1700	29.745	56	66	17	11	0
1800	29.805	64	60	16	08	0
1900	29.815	72	57	17	07	0

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 WIND	KNOTS	TENTHS OF SKY
2000	29.815	69	55	17	07	0
2100	29.815	67	57	17	08	0
2200	29.820	74	55	18	07	0
2300	29.825	83	50	19	07	0
2400	29.820	77	53	18	08	0

WACO, TEXAS AIRPORT WEATHER STATION

HOURLY OBSERVATIONS

December 1, 1973

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360	KNOTS	TENTHS OF SKY
				WIND		
0100	29.810	74	56	18	11	0
0200	29.810	80	55	19	11	0
0300	29.820	83	54	17	07	0
0400	29.820	86	52	19	06	0
0500	29.820	90	49	18	06	0
0600	29.830	93	48	18	07	0
0700	29.840	93	48	18	05	0
0800	29.850	89	50	14	03	0
0900	29.860	80	56	15	05	0
1000	29.870	72	62	18	08	0
1100	29.850	59	69	18	13	0
1200	29.820	53	71	19	12	0
1300	29.790	50	73	17	14	0
1400	29.760	50	73	17	12	0
1500	29.750	50	73	17	13	0
1600	29.740	53	71	17	11	0
1700	29.735	59	68	17	10	0
1800	29.725	75	61	16	06	0
1900	29.735	81	58	15	06	0

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 KNOTS WIND		TENTHS OF SKY
2000	29.740	75	59	15	09	0
2100	29.740	75	59	16	09	0
2200	29.735	78	59	16	09	0
2300	29.725	75	59	18	09	0
2400	29.710	75	58	16	11	0

WACO, TEXAS AIRPORT WEATHER STATION

HOURLY OBSERVATIONS

December 2, 1973

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 KNOTS WIND		TENTHS OF SKY
0100	29.700	78	57	18	12	0
0200	29.680	83	56	18	12	0
0300	29.660	87	55	17	10	0
0400	29.650	87	55	18	10	0
0500	29.630	90	54	17	10	0
0600	29.620	93	53	17	08	10
0700	29.640	97	53	17	09	10
0800	29.640	93	54	18	08	10
0900	29.650	93	54	17	10	10
1000	29.640	90	56	16	09	10
1100	29.620	84	59	16	12	10
1200	29.600	75	64	17	13	5
1300	29.530	64	71	17	13	3
1400	29.490	57	72	17	16	3
1500	29.460	55	72	17	15	10
1600	29.445	55	72	16	13	7
1700	29.435	59	70	16	11	8
1800	29.415	59	69	15	12	8
1900	29.405	61	69	15	15	10

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 KNOTS WIND		TENTHS OF SKY
2000	29.415	70	67	15	18	10
2100	29.415	70	67	15	17	10
2200	29.405	75	65	14	18	10
2300	29.405	81	64	16	13	10
2400	29.395	81	64	16	13	10

WACO, TEXAS AIRPORT WEATHER STATION

HOURLY OBSERVATIONS

December 3, 1973

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360 KNOTS WIND		TENTHS OF SKY
0100	29.370	84	64	15	15	10
0200	29.370	87	64	14	17	10
0300	29.330	90	63	14	17	10
0400	29.290	90	63	14	17	8
0500	29.290	90	63	15	17	10
0600	29.280	90	65	15	16	10
0700	29.270	87	66	17	15	10
0800	29.270	90	66	17	11	10
0900	29.255	90	67	17	12	10
1000	29.230	87	69	17	14	10
1100	29.210	82	71	17	15	10
1200	29.160	82	72	19	16	10
1300	29.140	70	68	26	14	8
1400	29.120	55	70	30	12	9
1500	29.090	30	71	30	15	8
1600	29.100	29	68	30	13	10
1700	29.120	32	66	27	08	10
1800	29.150	32	63	26	13	10
1900	29.150	29	62	26	09	10

TIME	IN. HQ. PRESSURE	PERCENT R. H.	°F TEMP.	360	KNOTS	TENTHS OF SKY
				WIND		
2000	29.160	27	60	26	12	10
2100	29.160	35	55	27	09	3
2200	29.170	40	53	19	08	0
2300	29.160	40	53	20	15	0
2400	29.170	34	55	21	15	0

DAILY CRITERIA EXCEEDANCES

NO.	DAY	DAILY CRITERIA LEVELS	S1	S2	S3	S4	S5	S6	S7	S8	P1	P2	P3	P4	P5	P6	P7	P8
			S I T E															
1.	a.	$L_{10} \geq 60$			*			*	*					*				
	b.				*				*					*				
2.	a.	$L_{10} \geq 70$																
	b.																	
3.	a.	$L_{eq} \geq 55$			*	*		*	*					*				
	b.				*				*	*	*			*				
4.	a.	$L_{dn} \geq 55$			*	*	*	*	*			*		*	*	*		*
	b.				*	*	*		*		*	*		*	*	*		
5.	a.	$L_{eq} \geq 75$																
	b.																	
6.	a.	$L_{dn} \geq 75$																
	b.																	
7.	a.	≥ 81 for 4.2% of time																
	b.																	
8.	a.	≥ 75 for 33.3% of time																
	b.																	
9.	a.	≥ 65 for 33.3% of time																
	b.																	
10.	a.	≥ 45 for 33.3% of time	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	b.		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

a. Denotes first day of sampling b. Denotes second day of sampling

* Denotes a criteria has been equaled or exceeded

Criteria 1. and 2. are designated by F.H.W.A. in highway planning and proper land use as maxima for residential and park areas.
Criteria 3., 4., 5., and 6. are identified by E.P.A. as important measures for protection against activity interference and hearing loss.
Criteria 7., 8., 9., and 10. are identified by H.U.D. for planning new housing areas.

SITES RANKED IN ORDER OF QUIETNESS

SITE	DESCRIPTION
S-1	Desolate City Park
S-2, S-8, P-3, P-7	Old Suburban High School, Suburban Community College, V.A. Hospital, Suburban Elementary School
P-8	New Housing Development Near Airport
S-5, P-1, P-2, P-5, P-6	Old Community Suburb, City Hall, T.S.T.I., Semi-Rural Residential, Suburban School
S-4	Urban College
S-6	Highway 77-81 Interchange
S-3, S-7, P-4	Highway Interchange, High School Near IH-35, High School Near Highway

NOTE: Traffic increases in the area surrounding the site as the rank increases from 1. to 7.

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